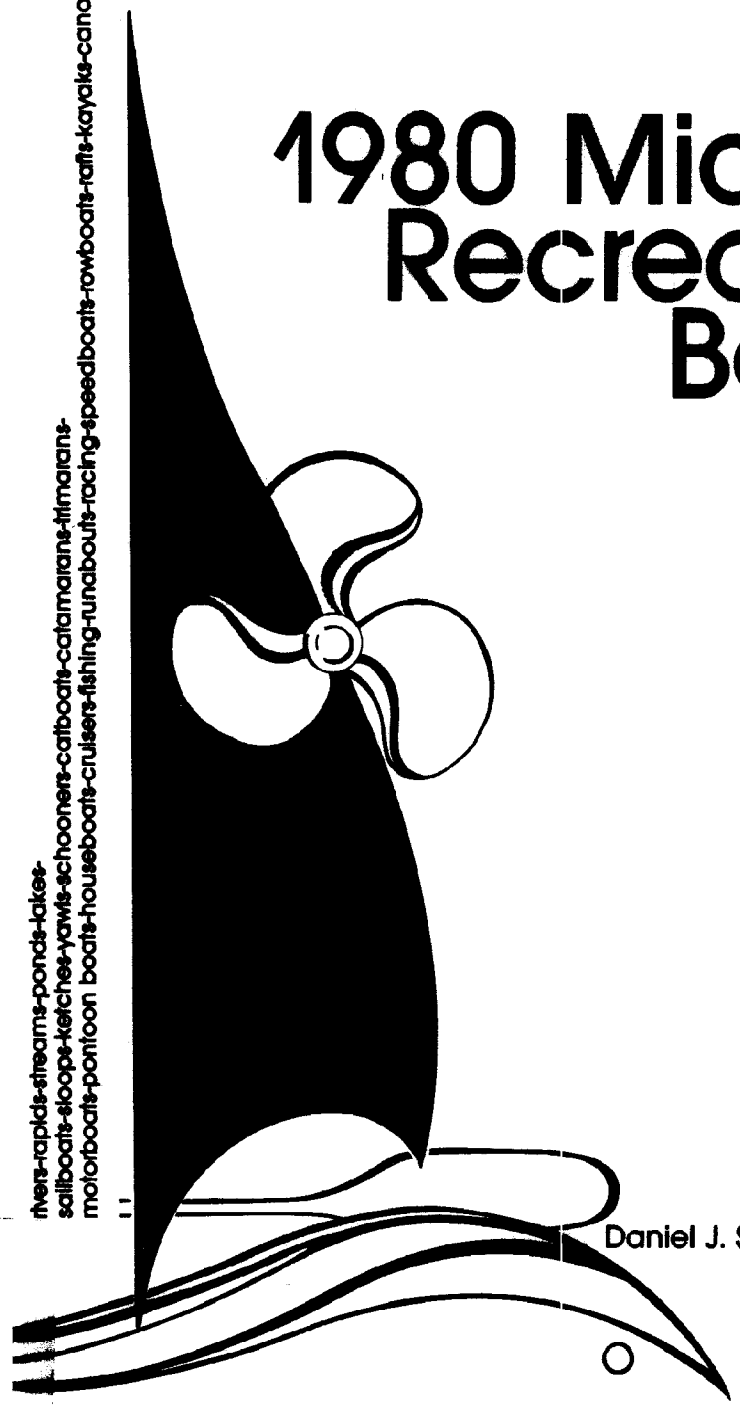
18549

BOATING

RECREATIONAL

rivers-rapids-streams-ponds-lakes-
sailboats-sloops-ketches-yawls-schooners-catboats-catamarans-trimarans-
motorboats-pontoon boats-houseboats-cruisers-fishing-runabouts-racing-speedboats-rowboats-rafts-kayaks-canoes-

1980 Michigan Recreational Boating Survey



Daniel J. Stynes and David Safronoff

MICHIGAN SEA GRANT -- MICHU-SG-82-202

1980 MICHIGAN RECREATIONAL BOATING SURVEY

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ABSTRACT

In 1980 the Michigan Sea Grant Program undertook a survey of registered boat owners in the state. This report documents the methods and basic results of the survey. Based upon almost 4000 respondents it is estimated that registered boats in Michigan logged 16.9 million boat days in 1980. This is an increase of 23% over 1977 levels. About one third of all boat days took place on the Great Lakes and connecting waters, the remaining two thirds occurring on inland lakes and streams. Boaters averaged 33 days of boating in 1980 with larger boats stored at waterfront sites the most active. Fishing is the most popular boating activity, accounting for over half of all boat days and almost 60% of all Great Lakes boat days. The largest increase in boating between 1977 and 1980 was in small boat activity on the Great Lakes.

The average boat owner is 50 years of age, a high school graduate, and has an income (median) of $23,000. Sail boaters tend to be more educated, younger, and have higher incomes than power boaters. Older and younger families are the two largest life cycle segments among boat owners. Almost one in every three boat owners is an empty nester. The average age at which current boat owners purchased their first boat is 34. Demographic trends promise a strong boating market through the year 2000 if it is not unduly constrained by economic conditions or supply constraints.

Southeastern Michigan continues to generate the majority of boat days in the state, although the largest increases in boating activity are occurring in northern Michigan. Second home developments, retirement, and northern migration are all contributing to increased pressures on boating facilities in northern Michigan. The Saginaw Bay region has also witnessed significant increases in Great Lakes boating activity in response to improved water quality and fishing. Boating patterns are best understood by examining summer storage of boats. Forty percent of all registered boats are stored at non-waterfront homes and trailered to access and launch sites. Eighty percent of all launchings are generated by these boats. About one in four boats is stored at a permanent waterfront home. Another one in every four boats is stored at a summer waterfront home. These boaters primarily boat from these locations. Marinas provide storage for about six percent of the registered fleet, primarily larger cabin and sail boats on the Great Lakes.

ACKNOWLEDGEMENTS

A survey of this magnitude requires the cooperation and assistance of many people. We especially wish to thank the Michigan Sea Grant Program for financial and technical support. We also acknowledge Waterways Division of Michigan's DNR for their cooperation in this effort. Jim Oakwood was most cooperative in sharing results of previous boater surveys as well as his accumulated experience in boater surveys. Keith Wilson and Les Nichols have provided answers to many questions and reviewed drafts of this report. The Secretary of State's office provided lists of registered boaters.

Colleagues at Michigan State and in the Sea Grant Program have provided helpful reviews and inputs at several stages of this research. Don Holecek and Dan Talhelm assisted with the initial design of this study. Chuck Pistis has provided opportunities to present and discuss boating research with boat dealers and marina operators. These opportunities have helped us to assess the industry's research needs and to better interpret our results. Many students in the Department of Park and Recreation Resources helped with the major task of mailing, coding, and data checking. David Feltus coded all of the open ended responses and prepared Tables 29 and 30 in this report. Bill Gartner helped prepare Tables 41-43.

Bettye Warren, Patricia Block, Betty Clifford, Marcia Tucker, and Sue Rosenbrook all contributed to the job of typing and editing several drafts of this report.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (con't)

LIST OF TABLES (con't)

CHAPTER I

INTRODUCTION

In 1979 the Michigan Sea Grant Program initiated a program of recreation and tourism research in the Great Lakes coastal zone. Great Lakes recreational boating provided the initial focus for this program. This publication is the second in a series of reports on Great Lakes boating. The first report, Michigan Great Lakes Recreational Boating; A Synthesis Of Current Information provided a comprehensive summary of previous boating research and information collected prior to 1980. This report updates statewide boating statistics based upon the 1980 Michigan Recreational Boating Survey.

Michigan has been a national leader both in the extent of recreational boating in the state as well as in research and planning studies to support boating activity. The 1980 boater survey is the seventh in a series of comprehensive boater surveys dating back to 1964.[1] Previous surveys have been sponsored or conducted by Waterways Division, Michigan Department of Natural Resources.

Sea Grant undertook the survey in 1980 in order to maintain the pattern of surveys every three years and more importantly to test a number of refinements in the survey design and recreation planning models. While the early Michigan boating studies were some of the most advanced of their kind, since 1970 only minor changes in sampling have

[1]See Stynes and Holecek (1981) for a review of these studies.

been made in the study design. Advances in recreation planning models and changes in planning needs suggested the development and testing of improved and more cost effective methods. In particular, models which disaggregate boaters into distinct market segments and integrated models capable of estimating and forecasting both use and economic impacts were desired. It is with these needs in mind that the 1980 Michigan Recreational Boating Survey was designed.

OBJECTIVES

1. Provide up-to-date information on recreational boating in Michigan.
2. Develop boater market segments by testing and evaluating alternative segmentation bases including demographics, equipment, boat use and storage, and reasons for boating.
3. Develop and test an integrated system of planning models for estimating and forecasting boating activity and the resulting economic impacts on state and local economies.

These objectives will be pursued in a series of three reports drawing upon the 1980 Recreational Boating Survey. This report describes the survey design and addresses objective one by presenting basic descriptive statistics for the 1980 boating season. We also present some simple segmentations of the boating market by boat types, activity types, boat storage, and use patterns. Subsequent reports will address boater market segments in greater detail and present results of modeling experiments.

OUTLINE OF THIS REPORT

Chapter II describes the 1980 Recreational Boating survey design

including sampling procedures, survey response, and survey limitations and errors. The survey, in part, replicates past boater surveys in order to provide comparable trend data. Changes in sample size, questionnaire design, and follow-up procedures from the 1977 survey are highlighted.

Survey results are presented in three chapters. Chapter III focuses upon the supply side of boating, describing the boating fleet, boating opportunities, and boat storage and launching patterns. Chapter IV describes the boat owner. Much of this information has not been included in recent boater surveys. The marketing orientation of the 1980 survey provides information on boat owner demographics, history of ownership, reasons for boating, and opinions and comments. Some preliminary market segmentations are examined. Chapter V summarizes aggregate boating use at state, regional, and county levels. These data are comparable to estimates for 1971, 1974, and 1977 from previous surveys. Boating use is estimated by origin, destination, and activity. Boater travel patterns are identified in regional origin-destination matrices.

Chapter VI concludes with a brief summary of the survey results and a preview of future reports based upon the 1980 Recreational Boating Survey data.

Before turning to the body of this report, a few notes are in order. The results which follow are based upon a survey of Michigan's registered boat owners. Descriptive statistics about the respondents describe boat owners, not all boaters. The data only include activity of boats that are registered in Michigan. Boating activity is divided between boat days taking place on the Great Lakes and connecting waters and boat days taking place on inland lakes and streams. We consistently use the

abbreviations GL and IL for Great Lakes (and connecting waters) and Inland Lakes (and streams) respectively. A "boat day" is defined as one or more individuals being on a boat in the water under power or sail for any part of a day. Statistics for boat days could be converted to "boater days" by applying estimates of the number of passengers on the boat (party size). Party size estimates were not made in the 1980 survey and therefore all estimates of boating activity are reported in "boat days".

CHAPTER II

SURVEY METHODS

The survey design for the 1980 Michigan Recreational Boating Study was patterned after previous boater surveys, most notably the 1974 and 1977 boater surveys.[1] The design called for a mailed survey of Michigan's registered boat owners conducted after the 1980 boating season. In order to capture fall boating activity the survey was mailed out in late November with most returns received before the Christmas holidays. The three study objectives dictated the kinds of questions included in the survey. A host of variables for segmenting boaters and for developing improved planning models were added to the 1977 survey instrument.

QUESTIONNAIRE DESIGN

The success of instruments from previous boater surveys convinced us to adopt a similar design, although changes were required to address objectives two and three and to reduce the costs of the survey. Eight new areas of information were added and questions on law enforcement, boating safety, and transporting and launching of boats were abbreviated. The four page format of the 1977 survey instrument was maintained although the number of questions was increased from 15

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[1] 1977 Michigan Recreational Boating Survey, 1979, Waterways Division, MDNR.
1974 Michigan Recreational Boating Study, 1975, Recreation Resource Consultants.

to 28. A copy of the 1980 survey instrument is included in Appendix A. The final instrument included 13 areas of information:

* 1. BOAT CHARACTERISTICS : length, type, propulsion, and horsepower (Q1-4)
* 2. BOAT OWNERSHIP HISTORY (Q 5, 7, 8)
3. BOAT STORAGE LOCATION (Q 6)
4. BOAT USE : Great Lakes and Inland by county (Q 9, 10, 12, 13)
* 5. BOATING ACTIVITIES : GL and IL (Q 11, 14)
6. TRANSPORTING AND LAUNCHING (Q 15)
* 7. PERCEPTIONS OF BOATING OPPORTUNITIES (Q 16, 17)
* 8. CHANGES IN FREQUENCY AND LOCATION OF BOATING (Q 18)
* 9. REASONS FOR BOATING (Q 19)
10. BOATING LAW ENFORCEMENT (Q 20)
*11. BOATER DEMOGRAPHICS : age, education, race, income, children (Q 21-27)
*12. SECOND HOME OWNERSHIP (Q 26)
13. OPINIONS AND PROBLEMS : open ended (Q 28)

Question areas not included in the 1977 instrument are denoted with an asterisk. These questions will provide data for segmenting boaters into distinct types and will also be used in testing refinements to planning models.

Of the questions carried over from the 1977 survey, the boat use questions remained unchanged. Storage questions were modified slightly to more clearly distinguish between GL and IL waterfront locations. Boat characteristics, although available on the boat

registration files, could not be related to survey information in previous studies. These data were therefore added to the 1980 instrument as a check on sample representativeness and as a possible segmentation basis.

The similarity with previous successful boater survey instruments simplified the task of reviewing and pre-testing the survey instrument. The instrument was revised several times based upon reviews from Waterways Division, selected survey researchers and pretests with a small sample of boaters.

SAMPLING

The list of registered boats maintained by Michigan's Secretary of State provided a suitable sampling frame. A current list dated August 1, 1980 was used. Sampling from boat owner registration lists is the most efficient and cost effective method of reaching boaters, although some biases are inherent in this sampling frame. Only registered boat owners are eligible for inclusion. It should be noted that the unit of analysis here is the boat, not the boater. Profiles of boat owners will differ from the general boating populations. In particular, owners of more than one boat will be overrepresented.[1]

The sample was stratified by boat length and region of registration in order to obtain good geographic coverage and sufficient craft

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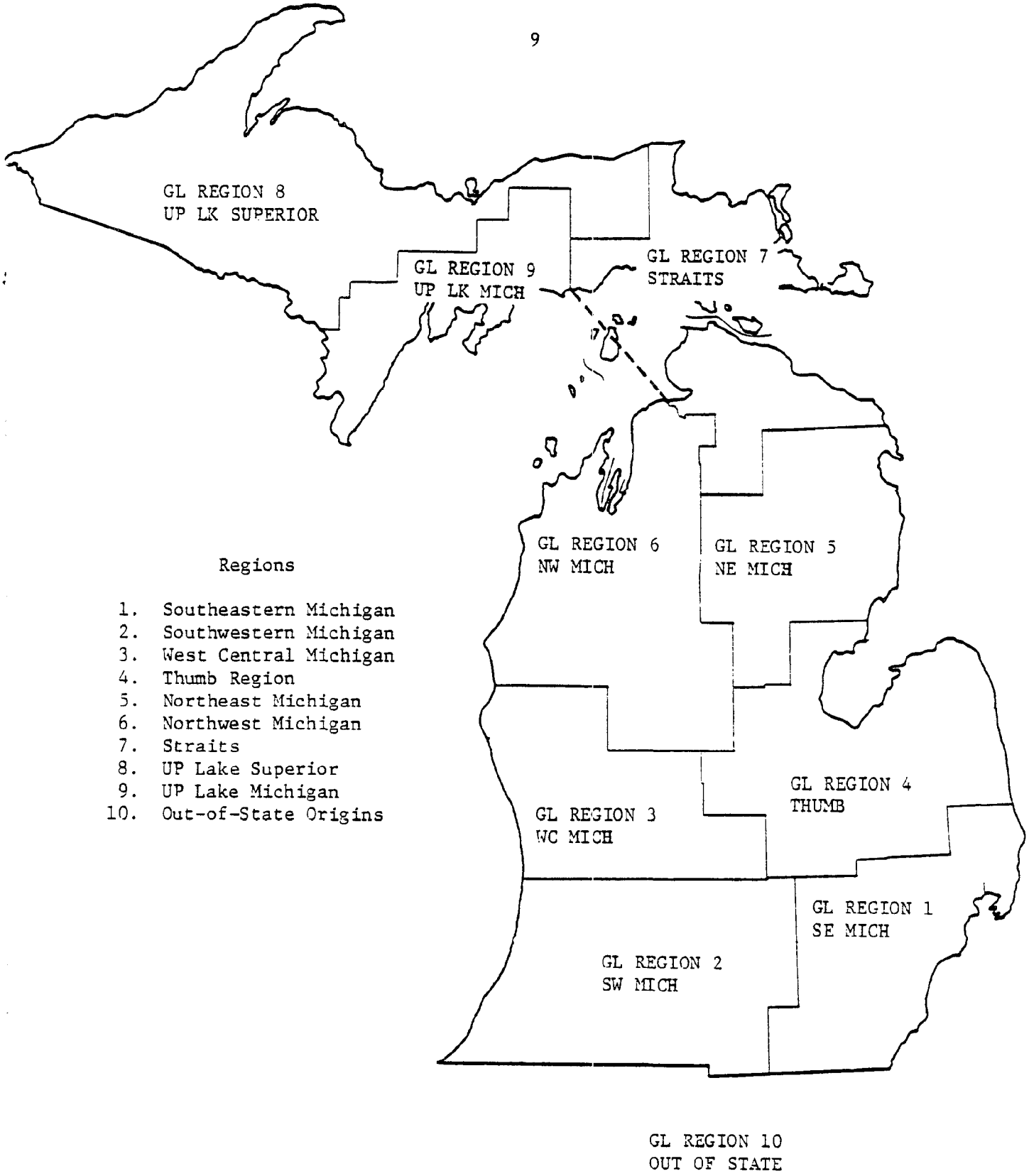
[1]The sampling scheme samples boats, not boat owners. However, some descriptive statistics are developed for boat owners. This will be biased slightly by the multiple boat owner problem. See Chubb, 1971 for estimates of the extent of this problem.

in each region and size class to estimate regional statistics. There were 10 regions and two boat size classes, yielding 20 distinct strata.

The ten boating regions were developed by examining Great Lakes boating patterns from the 1977 boater survey. The regionalization is illustrated in Figure 1 and described in detail in Appendix B. Disproportionate sampling was used to obtain sufficient samples within each region to estimate regional statistics within roughly a 5% sampling error. This required approximately 200 craft within each region. For more detailed analysis within highly populated regions sample sizes considerably larger than 200 were desired. The sampling plan compromises between a proportionate to size approach and a fixed number within each stratum.

Within each region craft were divided into two classes: those less than twenty feet in length and those 20 feet or greater in length. This division is consistent with previous boater sampling designs. Since the size class distribution is fairly uniform throughout the state (about 12% of craft are 20 feet or longer) a fixed proportion of the sample allocated to each region was taken from large and small boats. One third of the sample were large boats and two thirds were small boats. The distribution of registered boats in the population and sample by region and size class are given in Tables 1 and 2 respectively.

The sample was drawn using a systematic sampling procedure with a distinct sampling interval for each stratum. A work tape containing the registration number, county of registration, and boat length of



Regions

1. Southeastern Michigan
2. Southwestern Michigan
3. West Central Michigan
4. Thumb Region
5. Northeast Michigan
6. Northwest Michigan
7. Straits
8. UP Lake Superior
9. UP Lake Michigan
10. Out-of-State Origins

FIGURE 1. MICHIGAN GREAT LAKES BOATING REGIONS

TABLE 1. DISTRIBUTION OF 1980 MICHIGAN REGISTERED BOAT POPULATION BY REGION AND SIZE CLASS

Number of Boats / % of Population	LENGTH IN FEET < 20'	≥ 20'	Totals
Region			
1	174,276 29.3	32,915 5.5	207,191 34.8
2	101,193 17.0	9,697 1.6	110,890 18.6
3	65,109 10.9	7,428 1.2	72,537 12.2
4	72,056 12.1	7,011 1.2	79,067 13.3
5	19,629 3.3	2,075 .3	21,704 3.6
6	36,936 6.2	3,585 .6	40,521 6.8
7	16,240 2.7	1,523 .3	17,763 3.0
8	18,282 3.1	1,017 .2	19,299 3.2
9	6,752 1.1	413 .1	7,165 1.2
10	16,657 2.8	2,303 .4	18,960 3.2
Totals	527,130 88.6	67,967 11.4	595,097 100.0

Source: Waterways Division, MDNR

TABLE 2. 1980 SAMPLE DISTRIBUTION BY REGION AND SIZE CLASS

Number of Boats / % of Sample	LENGTH IN FEET <20'	≥20'	Totals
Region			
1	796 13.1	440 7.2	1236 20.3
2	624 10.2	287 4.7	911 15.0
3	501 8.2	224 3.7	725 11.9
4	590 9.7	262 4.3	852 14.0
5	295 4.8	127 2.1	422 6.9
6	473 7.8	202 3.3	675 11.1
7	265 4.4	119 2.0	384 6.3
8	286 4.7	110 1.8	396 6.5
9	174 2.9	69 1.1	243 4.0
10	164 2.7	83 1.4	247 4.1
Totals	4,168 68.4	1,923 31.6	6,091 100.0%

all craft registered as of August 1, 1980, was obtained from the Michigan Secretary of State. Sampling intervals for each stratum were calculated to yield the desired sample size and then applied to the work tape to select registration numbers of the sampled boats. Names and addresses corresponding to these sample numbers were then provided by the Secretary of State. Using these procedures, a total sample of 6091 registered craft was selected.

It should be noted that within each region an equal number of boats were selected from each county in the region. Thus, if there were ten counties in the region, each county accounted for 10% of the region's sample. Based upon an anticipated response rate of 70%, this design would yield at least 50 boats in each county within the four southern Michigan regions, and no fewer than 39 sampled craft in any Michigan county. Since there is some variation in the number of registered craft by county within each region, this procedure may yield some bias in the regional samples. Craft from counties with smaller numbers of registrations would have a greater likelihood of being selected. This might tend to bias boating use estimates downward since one might expect more boating and more registered boats in counties with ample boating opportunities. One might also speculate that boating frequency might be lower in densely populated areas with many registered craft.

The possible bias from this sampling scheme could be corrected by developing weights at the county level. This alternative was rejected since small samples at the county level would yield some very large weights that could introduce other types of bias in the use

estimates. In future studies we would recommend sampling proportionately by county within the ten regions to yield representative regional samples instead of attempting to obtain a minimum quota from each county.

SURVEY ADMINISTRATION

The list of 6091 names and addresses were first checked for incomplete addresses and commercial listings. Several hundred addresses lacked zip codes, street addresses, or city names. Through the use of telephone books and the Zip Code Directory all but 97 of these were completed. An additional 81 addresses were found to be commercial listings including resorts, marinas, and boat rentals. Boaters with incomplete addresses and commercial listings were deleted from the sample. An initial mailing to the remaining 5913 registered boat owners was sent on November 26, 1980. It included a cover letter, return envelope and postage, and a questionnaire. The first mailing was sent bulk rate.

Follow-up mailings included a postcard to all persons not responding by December 7 and another complete first class mailing to non-respondents as of December 24. On December 9, 4180 postcards were mailed. The final mailing on December 24 was sent first class and included 2803 names and addresses. The change to first class postage increased the receipt of non-deliverable letters. Only 47 undeliverable letters were returned from the initial mailing. After the final first class mailing 311 additional letters were returned due to incomplete addresses, no forwarding address, or deceased addressee. Combining undeliverable letters with incomplete addresses yields a

total of almost 8% of the sample addresses that could not be reached due to faulty or incomplete mailing addresses. It is unknown how many additional non-responses were the result of outdated, incomplete or inaccurate addresses on the registration tape.

Questionnaires were numbered to keep track of who had not responded and three sets of mailing labels were printed to handle bookkeeping of returns. Returns were dated as they were received and coding proceeded concurrently with the processing of returned questionnaires.

SURVEY RESPONSE

A daily record of returns was logged. Almost 30% of the deliverable surveys were returned within the first week. After the follow-up postcard, the response rate grew to 50% before the final mailing. The third mailing yielded an additional 20% in returns giving an overall response rate of 72% of the deliverable surveys. Of the coded returns, 565 subjects indicated they did not use their boat in 1980. These non-boaters constituted 14.5% of the returns. A detailed breakdown of responses is presented in Table 3. The timing of the mailings and returns is plotted in Figure 2.

Response rates varied somewhat by size class and region. Out-of-state boaters had the highest return rate (84%). Return rates for Michigan regions varied from 36% for region 7 to 53% for region 2 in the small boat class. Large boat return rates were somewhat higher ranging from 44% in region 9 to 69% in region 1.

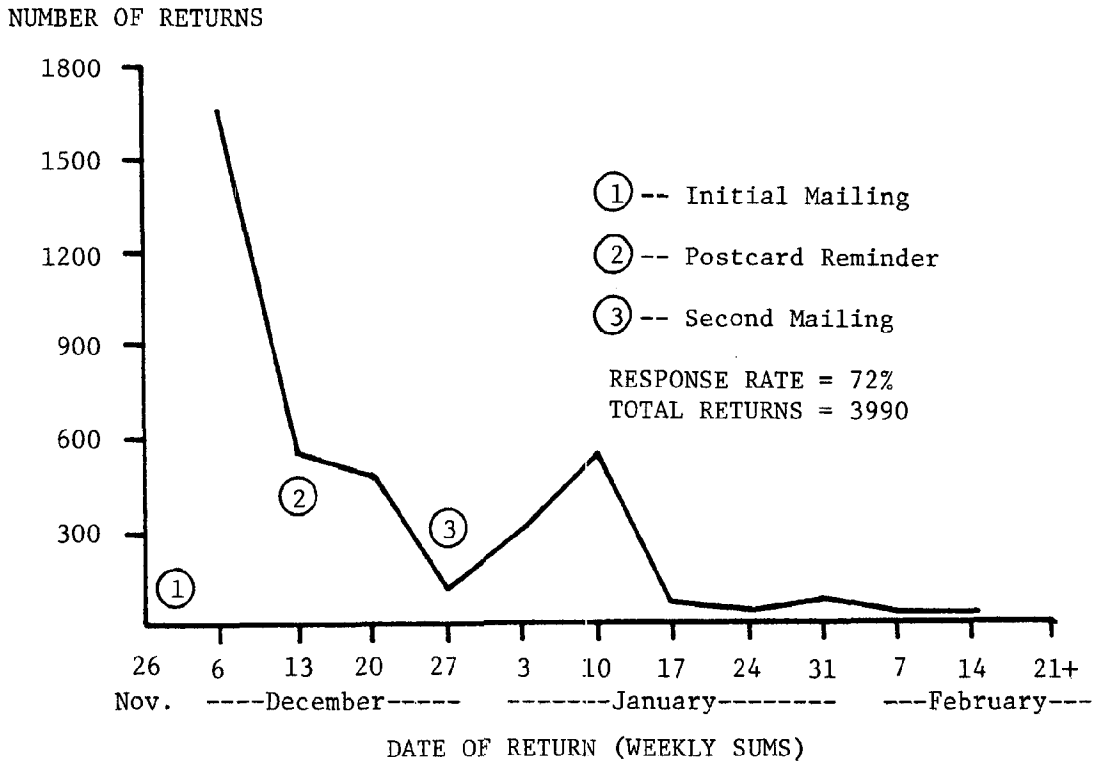


FIGURE 2. 1980 MICHIGAN RECREATIONAL BOATING SURVEY RESPONSE

TABLE 3. 1980 MICHIGAN BOATER SURVEY RESPONSE RATE

		Percent of Initial Sample (N=6091)	Percent of Deliverable Sample (N=5555)
Sample drawn	6091	100.0	
Deletions:			
Commercial	81	1.3	
Incomplete address	97	1.6	
Total Deleted	178	2.9	
Initial mailing	5913	97.1	
Returned as non-deliverable	358	5.9	
1980 Boaters	3341	54.5	60.1
Didn't Boat	565	9.3	10.2
Un-useable	84	1.4	1.4
Total Returns	3990	65.5	71.8
Nonresponses	1565	25.7	28.2
Total Deliverable Surveys	5555	91.2	100.0

WEIGHTING PROCEDURES

The variability in response rates and disproportionate sampling required the development of weights to balance the sample by region and size class. These were developed by comparing the actual returns to the numbers of registered craft reported by the Secretary of State on December 31, 1980. The numbers of registered boats was reduced by 14.5% to reflect the percentage of inactive boats in the 1980 sample. It was assumed that this rate of inactivity was uniform

throughout the state by both region and size class. The resulting weights by region and size class are given in Table 4. Small boat weights vary from 73 in region 9 to 354 in region 1. These weights indicate the number of craft represented by each respondent and when applied to the sample expand the boating use estimates to the total 1980 Michigan active registered boating fleet.

TABLE 4. 1980 MICHIGAN BOATER SURVEY RESPONSE BY SIZE CLASS AND REGION

Region	Boats Registered as of Dec. 31, 1980	% of Total	Sample Size	Responses Coded	% Response	Expansion Factor
			Boats Under 20 Feet in Length			
1	174,276	29.3	796	397	49.9	354
2	101,193	17.0	624	332	53.2	246
3	65,109	10.9	501	235	46.9	223
4	72,056	12.1	590	280	47.5	207
5	19,629	3.3	295	126	42.7	126
6	36,936	6.2	473	211	44.6	141
7	16,240	2.7	265	95	35.8	138
8	18,282	3.1	286	126	44.1	117
9	6,752	1.1	174	75	43.1	73
10	16,657	2.8	164	135	82.3	95
			Boats Over 20 Feet in Length			
1	32,915	5.5	440	305	69.3	87
2	9,697	1.6	287	146	50.9	54
3	7,428	1.2	224	141	62.9	42
4	7,011	1.2	262	154	58.8	37
5	2,075	.3	127	72	56.7	23
6	3,585	.6	202	95	47.0	30
7	1,523	.3	119	43	45.3	22
8	1,017	.2	110	61	55.5	13
9	413	.1	69	30	43.5	11
10	2,303	.4	83	71	85.5	25

Some respondents failed to report either the county of registration or boat length. These weights are reported in Table 5. Weights for those with an indefinite length are simply weighted averages of the small and large boat weights for that region based upon the percent of large and small boats in the sample. Boats with no designated county of registration were assigned the average weight (153) of all other boats in the sample. The total number of registered craft used in calculating weights in Table 6 were reduced by 2 percent to avoid double counting respondents with missing county or length data. The weights expand the sample to a total of 509,017 craft. This is the estimated number of active registered boats in 1980.

TABLE 5. EXPANSION WEIGHTS FOR UNDESIGNATED REGIONS AND COUNTIES

REGION	EXPANSION WEIGHT	NO. OF BOATS
	INDEFINITE LENGTH	
1	259.	16
2	185.	21
3	167.	24
4	155.	15
5	95.	10
6	108.	20
7	102.	9
8	88.	9
9	56.	2
10	71.	9
	INDEFINITE COUNTY	
ALL	153.	67

REPRESENTATIVENESS OF THE SAMPLE

Weighting procedures balance the sample to the distribution of registered boats by region and size class. The weighted sample therefore mirrors the actual distribution of registered boats in Michigan in 1980 (Table 1). The sample was also compared with population distributions with respect to boat propulsion type and more detailed size classes. Table 6 reveals that the sample compares favorably with the population across eight different length categories and five different boat propulsion types. The only large discrepancy is a shifting in size category of outboards between 12-16 and 17-20 feet. The sample includes more boats in the larger size category than the registration statistics. This and other minor differences in Table 6 could be attributed to inconsistencies in reporting, some lack of precision in the categories, or differences in rates of inactivity among different types of boats. The sample appears to be representative of the boating fleet.

Lack of other secondary sources of data on the boating population precludes additional tests of representativeness. The following section discusses study limitations and sources of possible bias in the sample and responses.

STUDY LIMITATIONS AND SURVEY ERROR

In any survey as complex as this there are a number of assumptions that must be made and many ways that errors may enter. Sampling errors are only one source of error and tend to be small compared with nonsampling errors. No estimates of nonsampling errors may be

TABLE 6. COMPARISON OF SAMPLE WITH 1980 REGISTERED BOAT POPULATIONS[1]: PROPULSION AND LENGTH

% of Sample (weighted) / % of Boat Registrations		BOAT LENGTH								
		<12	12-16	17-20	21-28	29-35	36-42	43-50	>50	Totals
PROPULSION TYPE		percent of total								
	INBOARD	0.0	.7	7.2	3.2	.7	.2	.2	0	12.1
		.2	.6	5.2	3.7	1.0	.4	.1	0	11.2
	OUTBOARD	1.8	48.2	23.2	2.9	.1	0.0	0.0	0	76.3
		4.1	58.9	9.8	.8	0.0	0.0	0.0	0	73.6
	SAIL	.1	2.9	1.5	.2	0.0	0.0	0.0	0	4.7
		.1	3.4	1.5	.2	0.0	0.0	0.0	0	5.3
	SAIL/AUX.	0.0	.2	.3	.8	.2	.2	0.0	0	1.7
		.1	.1	.1	0.0	0.0	0.0	0.0	0	.3
	OTHER	.3	1.7	2.1	.9	0.0	0.0	0.0	0	5.1
		.2	1.3	3.0	4.5	.5	.1	0.0	0	9.7
	TOTALS	2.2	53.8	34.3	8.1	1.1	.4	.2	0	100.0
		4.6	64.4	19.6	9.2	1.6	.5	.1	0	100.0

[1]1980 registration figures, including all craft registered as of December 31, 1980, were provided by Waterways Division, MDNR.

given. These can only be minimized by suitable controls and strict adherence to survey methods. Technical errors were controlled through editing and pretesting of the survey instrument, double checking all coding and keypunching, and extensive data cleaning procedures to check for out-of-range or inconsistent responses.

Follow-up procedures were designed to minimize possible non-response bias. The 72% response rate from deliverable questionnaires is deemed quite successful for this type of mailed survey. The number of undeliverables and incomplete addresses suggests that a portion of non-respondents did not receive a survey instrument. Lower response rates are anticipated for persons who have moved recently or no longer boat. While non-boaters were encouraged to return their questionnaire, we suspect the rate of inactivity may be greater than the 14.5% observed in the returns. As in previous boater surveys, large boat owners had higher response rates than small boat owners, although this bias is partially corrected in the weighting procedures. There is some evidence of higher response rates among sail boaters and older boaters. Many of the late returns were from boaters who spend their winters in Florida. We usually expect higher response rates among the more active boaters giving use estimates an upward bias.

The high incidence of second home ownership among boaters yields some confusion in the county of registration, some boaters registering their boat at county of permanent residence and others at their second home location. While the survey identifies both permanent residence and second home location, there is no way of knowing at which location the boat is registered. This could bias the weights slightly since we

had to assume the boat was registered at the county of permanent residence. However, analyses with the 1977 boater survey data comparing county of residence with county of registration yielded no significant differences in estimates of boating use or origin-destination patterns under either assumption.

Undoubtably some boaters will misclassify use in GL or IL categories and recall of both days of use and county will yield recall errors. However, consistency with previous boat use estimates was desired and designs to reduce recall errors would be very expensive and complex. Other possible difficulties in particular questions will be discussed later in the report.

Sampling errors can be roughly estimated assuming simple random sampling. Stratification by size class and region, where it results in variance reductions, will generally reduce sampling errors over what would be obtained via simple random sampling. It may, however, increase sampling error. Development of precise sampling errors for different estimates under the disproportionate stratified sampling design used is quite complex. We therefore assume that error estimates under simple random sampling assumptions provide a reasonable estimate of survey error. Table 7 gives estimates of sampling errors at the 95% confidence level for different sample sizes assuming a binomial distribution in the population. Estimates based upon the statewide sample will therefore lie within 2 percent of the actual proportion. With 700 subjects in Region 1, estimates for that region will be within 2-4% of the population parameter. With just over 100 subjects from region 9, estimates for that region will be subject to sampling

errors of from 7 to 11%. One should avoid attempting to directly estimate statistics at the county level. Only counties in region 1 contain samples of at least 100 boaters and even this sample size is subject to sampling errors of up to 11 percent.

TABLE 7. SAMPLING ERRORS FOR SELECTED SUB-SAMPLE SIZES

		population percentage estimate				
	Subsample Size	10/90	20/80	30/70	40/60	50/50
	3,000	1	2	2	2	2
	2,000	2	2	2	2	3
	1,000	2	3	3	3	4
Size of sample	500	3	4	5	5	5
on which estimate	400	3	4	5	5	5
is based	300	4	5	6	6	6
	200	5	6	7	8	8
	100	7	9	10	11	11

CHAPTER III

BOAT STORAGE, LAUNCHINGS, AND BOATING OPPORTUNITIES

In this chapter we summarize the characteristics of the 1980 active Michigan registered boating fleet. Boats are divided into classes according to their storage location during the 1980 boating season. These include waterfront locations on the Great Lakes and Inland waters as well as nonwaterfront locations. Boats kept at nonwaterfront locations must be transported and launched at a public or private access site. Marinas and boat clubs also provide waterfront storage and access for boaters. The 1980 boater survey also measured boaters' perceptions of the quality and quantity of boating opportunities near home.

THE 1980 ACTIVE REGISTERED BOATING FLEET

The active recreational boating fleet consisted of an estimated 509,017 registered craft in 1980. About 14.5 percent of the registered fleet were estimated to be inactive in 1980. The majority of the active boating fleet were small outboards classified in the open or row categories. Boats averaged just under 16 feet in length with an average horsepower of 56. Half of the powered craft are under 25 horsepower (Table 8). It should be noted that these figures and the survey results do not include large numbers of unregistered craft, including unpowered canoes, and sail boats under 12 feet in length.

TABLE 8. 1980 MICHIGAN ACTIVE REGISTERED BOATING FLEET BY LENGTH, PROPULSION, HORSEPOWER AND CRAFT TYPE

	Percent	Cumulative Percent	
LENGTH (feet)			
1 - 11	2.6	2.6	
12 - 15	53.8	56.4	Mean=15.8 feet
16 - 20	33.9	90.3	
21 - 28	8.0	98.3	Median=14.9 feet
28+	1.7	100.0	
PROPULSION TYPE			
Inboard	12.1	12.1	
Outboard	76.2	88.3	
Sail	4.8	93.1	
Sail w/power	1.7	94.8	
Other Nonpowered	1.4	96.2	
Other Powered	3.8	100.2	
HORSEPOWER (powered craft only)			
Less than 5	15.7	15.7	
5 - 10	22.0	32.7	
11 - 20	8.9	46.6	
21 - 40	15.8	62.4	Mean=56.0
41 - 60	8.9	71.3	
61 - 80	6.8	78.1	Median=25.3
81 -100	3.3	81.4	
101 -200	13.4	94.8	
201+	5.2	100.0	
CRAFT TYPE			
Open	54.6	54.6	
Cabin	5.3	60.0	
Sail	6.9	66.9	
Row	23.0	89.9	
Canoe	1.5	91.4	
Pontoon	7.6	99.0	
Other	1.0	100.0	

Michigan's registered fleet has grown steadily since boats were first registered in 1960. Between 1965 and 1977 the fleet increased at a nearly constant rate of 3.2% per year. Changes in the period of registration initiated in 1977 resulted in some fluctuations in this trend (Figure 3). Since 1977 the fleet has averaged an annual growth rate of about 1.5%. It is not yet clear to what extent this may be due to the changes in registration procedures or economic conditions in the state.

The distribution of registered boats in Michigan parallels population distributions, although per capita boat ownership is higher in regions that are less densely populated and have ample boating opportunities. Southeastern Michigan accounts for 35% of all registered craft in the state. Genesee and Kent counties contribute an additional five percent each. Trends in the geographic distribution of boats in the state are consistent with population trends over the past decade.

FIGURE 3. TRENDS IN BOAT REGISTRATIONS IN MICHIGAN, 1965-1980

The greatest population growth between 1970 and 1980 occurred in north-central Michigan and Livingston county (Figure 4). The numbers of registered boats doubled in seven counties between 1968 and 1980. These were Livingston, Alcona, Arenac, Delta, Gladwin, Kalkaska, and Oscoda counties (Figure 5). Over this same period registrations statewide increased by 35 percent. Southcentral and southwestern Michigan regions had the slowest growth in registered craft in the 1970's. Ingham county increased registrations by only 7 percent between 1968 and 1980.

While the makeup of the registered fleet has been fairly stable over time, there has been a long range trend towards higher percentages of inboards, sail boats, and craft over twenty feet in length (Figure 6, Table 9). Since 1977 the rate of increase in larger craft has been slowed.

BOAT STORAGE LOCATIONS - 1980 BOATING SEASON

During the 1980 boating season 43 percent of registered craft were kept at nonwaterfront locations, 40 percent at inland waterfront sites, and 17 percent at Great Lakes waterfront sites. Inland waterfront sites were divided evenly between permanent and summer homes. Permanent homes on the Great Lakes provide 40 percent of the GL waterfront storage; summer GL homes and commercial marinas each contribute an additional 22 percent (Table 10).

There are some significant differences in the types of boats stored at each of these locations. Marinas are primary storage locations for cabin cruisers and larger sail boats. Pontoon boats are generally kept at inland waterfront homes. Nonwaterfront locations are restricted to trailerable craft, primarily outboards and row boats. Outboards 16 feet

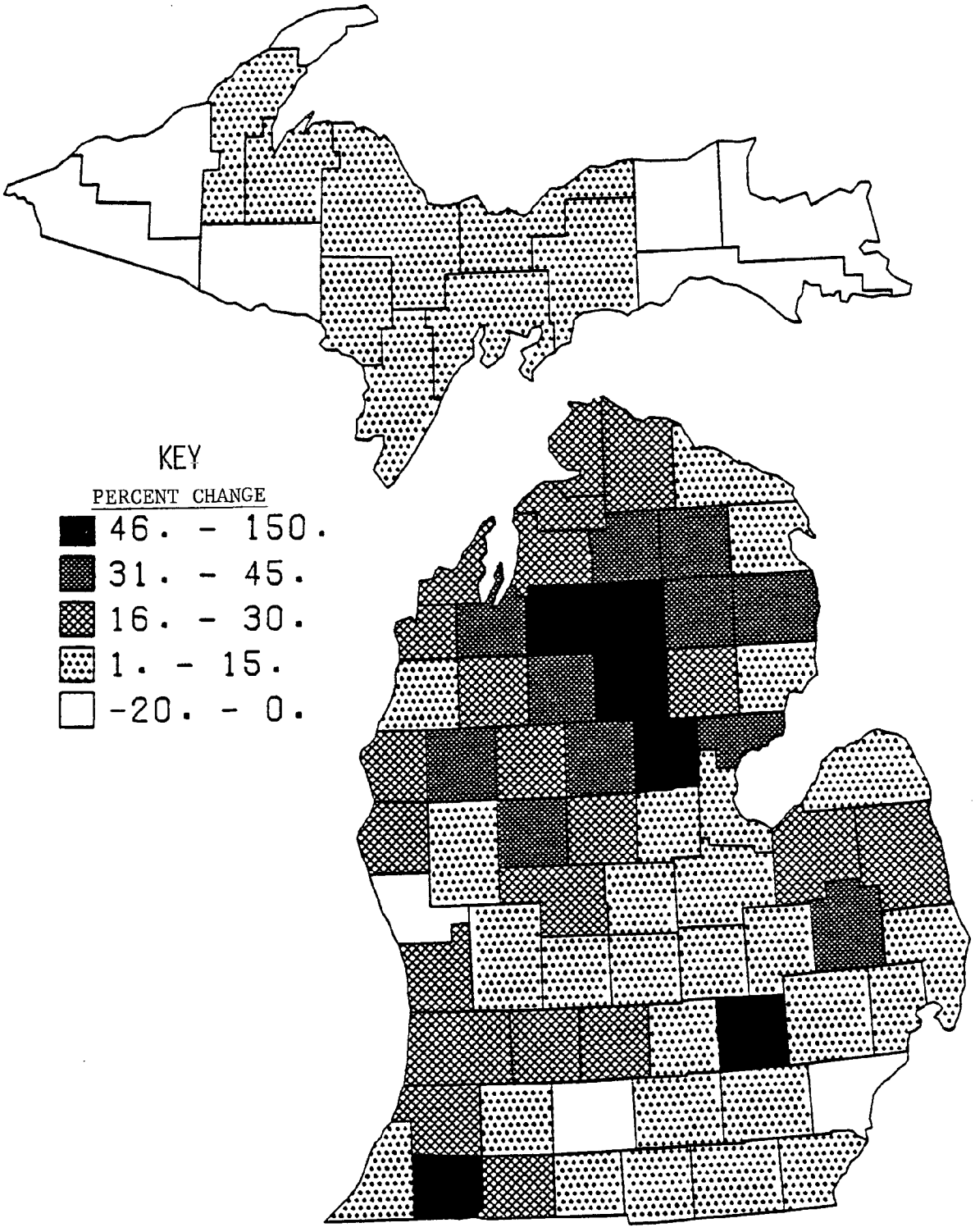


FIGURE 4. PERCENT CHANGE IN POPULATION, 1970-1980

Source: U.S. Census Bureau, 1980.

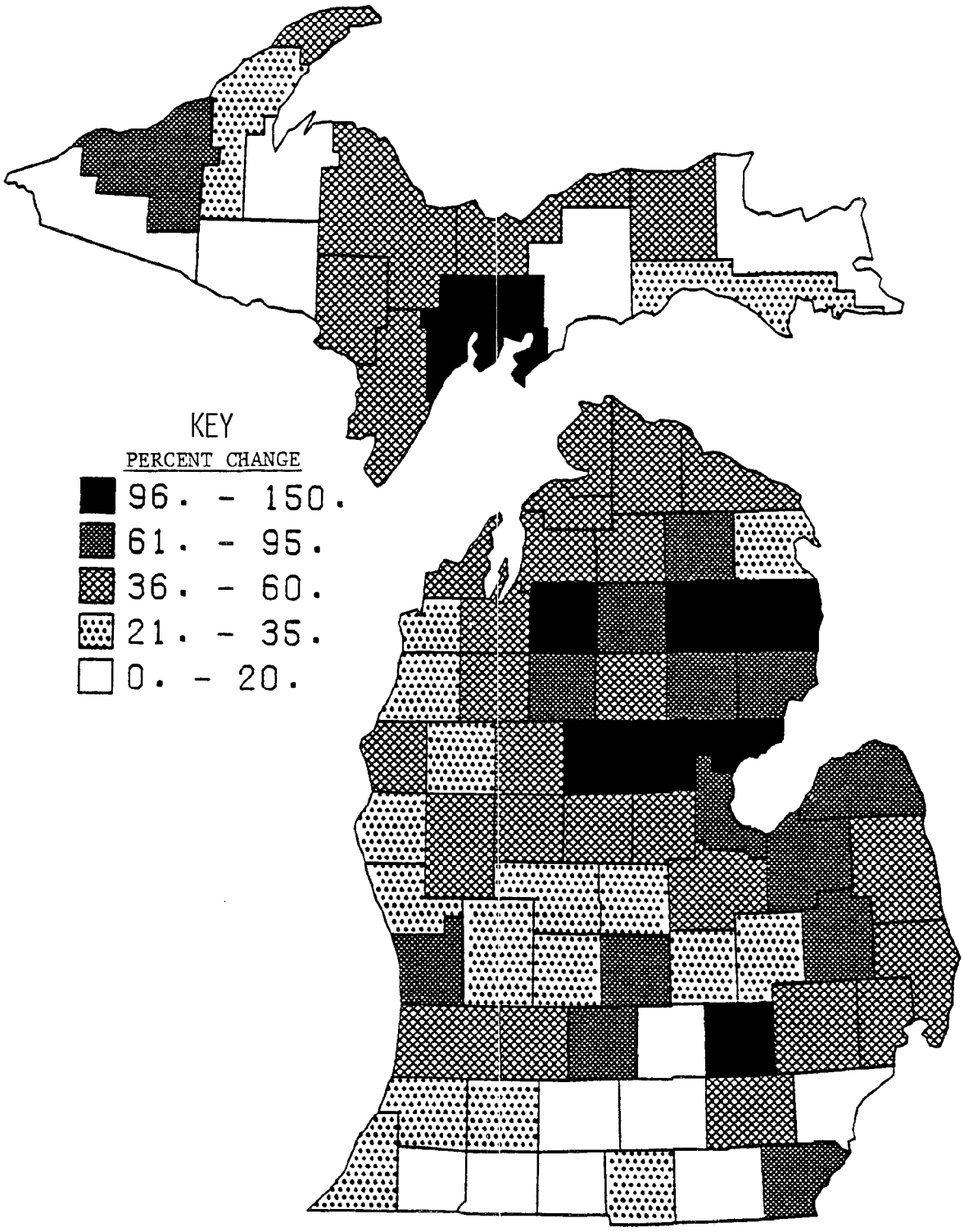


FIGURE 5. PERCENT CHANGE IN NUMBER OF REGISTERED BOATS, 1968-1980

Source: Michigan Secretary of State Boat Registration Statistics

TABLE 9. TRENDS IN THE MICHIGAN REGISTERED BOATING FLEET, 1965-1980

Boat Type	20 feet and under			Over 20 feet		
	1965	1980	Percent Change	1965	1980	Percent Change
	--number of boats--			--number of boats--		
Inboard	12,533	35,677	184	15,103	31,125	106
Outboard	363,475	459,987	26	4,842	35,228	627
Sail	1,755	31,446	1691	1,194	1,614	35
Total	377,763	527,130	39	21,139	67,967	221

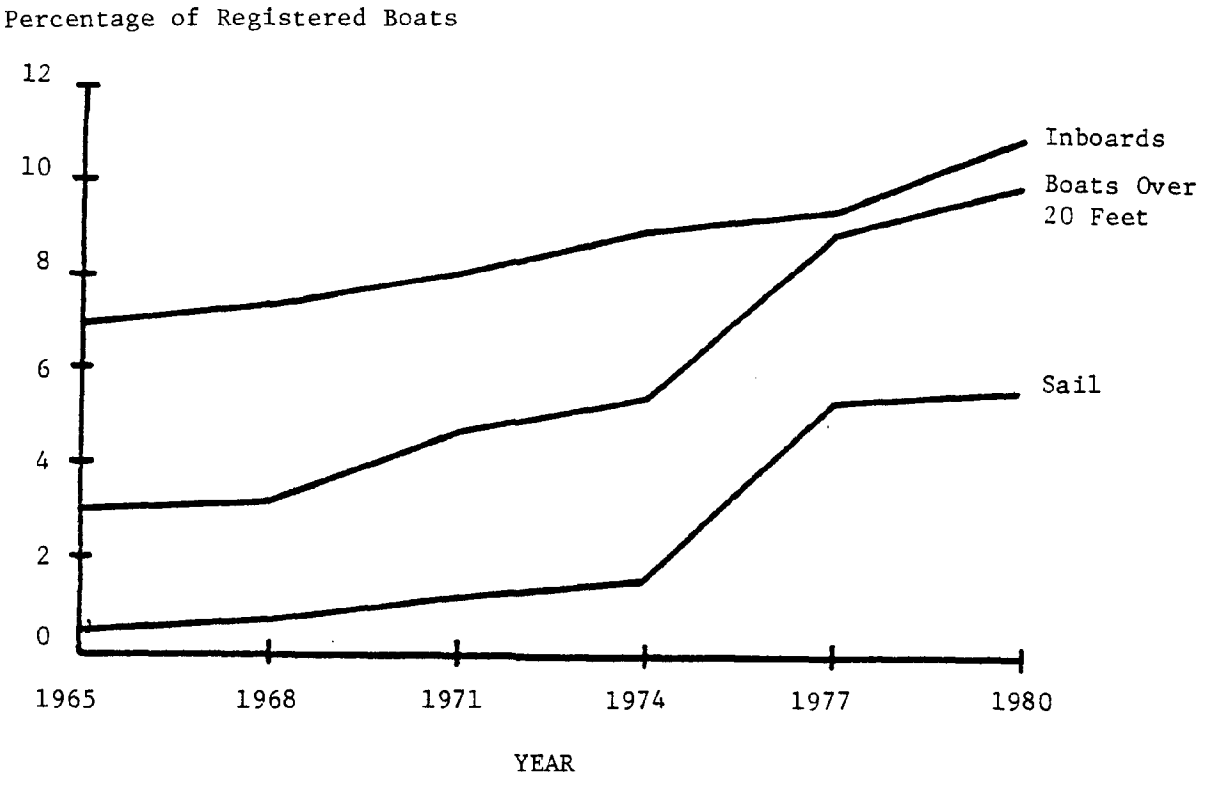


FIGURE 6. TRENDS IN THE MAKEUP OF MICHIGAN'S REGISTERED BOATING FLEET, 1965-1980

TABLE 10. BOATING SEASON STORAGE OF BOATS BY ACCESS TO WATER

Storage	Great Lakes Waterfront	Inland Lakes Waterfront	Non-Waterfront Site	Total
Permanent Residence	6.5	17.9	40.0	64.4
Summer Cottage/ Second Home	3.6	18.7	1.8	24.1
Commercial Marina	3.5	.5	0.0	4.0
Yacht Club	.9	.4	0.0	1.3
Public Marina	.8	.4	0.0	1.2
Other Location	1.4	2.1	1.5	5.0
Total	16.8	39.9	43.3	100.0

in length or greater have the most flexible storage requirements, accounting for between one-fifth and one-third of the boats at each type of storage location. Pontoon boats are mostly restricted to inland waterfront sites and cabin cruisers tend to be stored at Great Lakes waterfront sites, including marinas (Table 11).

Boaters using both GL and IL waters are predominantly large outboard owners who trailer their boats from a nonwaterfront permanent home. Marinas house twenty percent of those boats using only the Great Lakes. GL waterfront homes provide storage for 31 percent of the GL users while inland waterfront homes provide storage for over half of the IL users. Each of these are divided about equally between permanent and summer homes (Table 12). Boats using the GL are predominantly

TABLE 11. CRAFT TYPES BY SUMMER STORAGE LOCATION

Boat Type	Great Lakes Waterfront	Inland Permanent	Inland Summer	Non-Waterfront Site	Marina[a]	Other	Total
	percent						
Small Outboards (<16')	28.5	21.4	30.3	36.4	3.8	21.4	28.7
Large Outboards (≥16')	32.9	24.6	22.1	29.1	28.0	28.8	26.9
Cabin	16.8	.9	.3	1.9	37.3	8.4	5.5
Sail	9.3	7.3	8.4	3.6	25.5	7.1	7.2
Row	9.3	24.9	22.7	28.6	0.0	28.0	23.9
Pontoon	3.2	20.9	16.2	.3	5.4	6.3	7.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Includes commercial marinas, public marinas and boat/yacht clubs

large outboards, cabin cruisers, and sail boats while inland lakes support small outboards, row, and pontoon boats (Table 13).

TABLE 12. BOAT STORAGE BY GREAT LAKES vs INLAND USE

	GL Water-front home	IL perm. home	IL sum. home	Nonwater-front home	Marina	Other
	percent					
Boats using...						
GL ONLY	31.6	.7	.6	38.6	20.6	7.9
BOTH GL & IL	9.7	10.0	12.3	58.0	6.2	3.8
IL ONLY	1.7	26.4	28.7	36.9	1.8	4.5

TABLE 13. CRAFT TYPE BY GREAT LAKES vs INLAND LAKES USE

	Small Ouboards	Large Outboards	Cabin	Sail	Row	Pontoon
	percent					
Boats using...						
GL ONLY	24.1	39.9	19.0	9.4	6.5	1.7
BOTH GL & IL	28.4	44.1	5.4	7.1	14.0	1.0
IL ONLY	30.7	17.1	.6	6.8	32.0	12.7

TRANSPORTING AND LAUNCHING

Over half (56%) of all registered boats were transported at least once in 1980 to a launching site. Michigan registered boaters reported 4,575,000 launchings in 1980. These were divided between GL sites (41%) and IL sites (59%). There is approximately one launching for

every three GL boat days and one launching for every four IL boat days (Table 14).

TABLE 14. TRANSPORTING AND LAUNCHING OF BOATS AT GREAT LAKES AND INLAND SITES

	Total Launchings (000's)	Percent	Launchings/ Boat	Launchings/ Boat Day
Great Lakes	1,878	41	3.7	.35
Inland	2,697	59	5.3	.23
Total	4,575	100	9.0	.27

Boats kept at non-waterfront permanent homes accounted for 68 percent of all transported boats and 80 percent of all launchings. Transporting is greatest for outboards and row boats. Three-fourths of boats used only for fishing are transported. Outboards account for 85% of all launchings at GL sites. At IL sites outboards contribute 62 percent and row boats 33 percent. Outboards over 16 feet in length make up 52 percent of GL launchings whereas row boats and outboards under 16 feet make up 72 percent of IL launchings (Tables 15, 16).

Incidence of transporting of boats is highest in the Upper Peninsula and Thumb regions where there are fewer suitable waterfront locations for permanent or summer homes (Table 17).

TRENDS IN TRANSPORTING, LAUNCHING, AND STORAGE

Patterns of storage, transporting, and launching of boats have remained fairly stable over time. Table 18 summarizes the results of

TABLE 15. TRANSPORTING AND LAUNCHING OF BOATS BY CRAFT TYPE

Craft Type	Percent Transporting	Great Lakes Launchings	Inland Launchings
		----percent of launchings-----	
Small Outboards $<16'$	62	33	39
Large Outboards $\geq 16'$	64	52	23
Cabin	37	5	0
Sail	44	2	3
Row	59	8	33
Pontoon	10	0	0
TOTAL	56	100	100

TABLE 16. TRANSPORTING AND LAUNCHING OF BOATS BY SUMMER STORAGE CATEGORY

Summer Storage	Percent Transporting	Great Lakes Launchings	Inland Launchings
		-----percent of launchings-------	
GL waterfront home	34	8	2
IL waterfront permanent home	26	3	7
IL waterfront summer home	25	3	6
Non-waterfront home	90	81	80
Marine	34	2	0
Other	54	2	4
TOTAL	56	100	100

TABLE 17. TRANSPORTING AND LAUNCHING OF BOATS BY REGION OF REGISTRATION

Region	% Trans-porting	GL Launches TOT (000's)	GL Launches Avg/Boat	IL Launches TOT (000's)	IL Launches Avg/Boat
1	55	804	4.7	843	4.9
2	48	127	1.4	574	6.2
3	61	171	2.7	453	7.2
4	70	358	5.4	306	4.6
5	54	50	2.7	124	6.7
6	53	103	3.0	201	5.8
7	47	69	4.5	45	3.0
8	73	121	7.4	99	6.0
9	70	56	9.4	32	5.4
10	24	11	.7	16	1.1
TOTAL	56	1,878	3.7	2,697	5.3

the past three boater surveys. The percentage of boats trailered and launched at least once has remained between 55 and 60 percent since 1974. The increase in 1977 and subsequent decrease in 1980 seems to reflect a trend to larger trailerable boats between 1974 and 1977 and to some extent a curtailment of this trend during the years of gasoline price increases and economic difficulties between 1977 and 1980.

The large increase in number of launchings between 1977 and 1980 is probably a result of a change in the question format rather than a true trend. This result illustrates the difficulties of identifying trends from survey data. In 1977 boaters identified the number of launchings by both county and provider (federal, state, local, private).

TABLE 18. TRENDS IN TRANSPORTING, LAUNCHING, AND STORAGE, 1974-1980

	1974	1977	1980
Percent Transporting	54.9	59.7	55.7
Launchings (millions)	3.8	2.9	4.6[a]
Storage Location			
Nonwaterfront permanent residence	40.1	41.7	40.0
Summer cottage	31.0	26.6	24.1
Waterfront permanent residence	16.5	17.0	24.4
Commercial Marina	5.5	5.9	6.5[b]
Other	6.9	8.8	6.0

[a] Increase may reflect change in question in 1980 survey. See text.

[b] Includes public marinas and boat clubs.

SOURCE: 1974 Michigan Recreational Boating Study, 1977 Michigan Recreational Boating Survey, and 1980 Michigan Recreational Boating Survey

The question was simplified in 1980. County and provider data were deleted from the question and the boater was asked to report the total number of launchings at GL and IL sites. This simplification yielded a 58% increase in launchings over 1977. The question remains whether (1) both 1977 and 1980 figures are accurate and a significant increase did occur, or (2) one or both of these estimates are in error. One might argue that boaters were reluctant to complete the detailed breakdown of launchings resulting in an under-reporting in 1977. Or, one might argue the detailed breakdowns resulted in better recall than the

gross estimates of launchings requested in 1980. Further research is required to sort out these issues.

Storage locations have remained stable over time. The most significant change between 1977 and 1980 was an increase in storage at permanent waterfront homes. Coupled with slight decreases in second home storage, this suggests some conversion of second homes to permanent homes. This hypothesis would be supported by the large number of boaters of retirement age and recent population migration patterns in Michigan.

BOATING OPPORTUNITIES

One addition to the 1980 boater survey was a series of questions to measure the boaters' perceptions of the quality and quantity of boating opportunities throughout the state. Respondents indicated the number of different places for boating within an hour's drive of their home that they were aware of and the number they actually used in 1980. Boat owners also evaluated the quality of these opportunities on a scale from 1=excellent to 6=very poor. These variables will be used in forthcoming attempts to model boater origin-destination decisions.

As a whole, boaters were aware of an average of 11 boating sites within an hour's drive of home, but used on the average only two of these sites. GL boaters were aware of less than six sites near home for the types of boating they enjoy, while IL boaters could identify 13 such sites. There was little difference between GL and IL boaters in quality ratings. Boaters rated the quality of opportunities near home between "very good" and "good."

There were some regional differences in boaters' perception of

the quality and quantity of boating opportunities (Table 19, Figures 7 and 8). Northwest Michigan (Region 6) attained the highest overall quality rating from local residents and also ranked among the highest in the numbers of opportunities for both GL and IL boaters. Thumb area (Region 4) and out-of-state boaters (Region 10) reported the fewest boating opportunities near home. Region 4, including the Thumb and Saginaw Bay counties also obtained the lowest quality rating. Southwestern Michigan (Region 2) rated high for IL boating, but low in quality and opportunities for GL boating.

On the whole, boaters seem quite satisfied with local boating opportunities. They are generally aware of several suitable sites near home, but only use one or two of these. Boaters who use both the GL and IL reported use of almost twice as many sites as boaters who restrict their use to one of the two bodies of water.

TABLE 19. BOATER PERCEPTION OF QUANTITY AND QUALITY OF BOATING OPPORTUNITIES WITHIN AN HOUR'S DRIVE OF HOME BY REGION

Region	Sites Aware of			Sites Used in 1980			Quality Rating[b]		
	GL Boaters	Both[a]	IL Boaters	GL Boaters	Both[a]	IL Boaters	GL Boaters	Both[a]	IL Boaters
1	5.9	11.2	12.6	1.5	2.9	1.4	2.3	2.5	2.3
2	3.6	14.5	16.7	1.7	3.3	2.3	2.9	2.6	2.4
3	5.0	12.6	12.8	.9	3.5	2.6	2.3	2.6	2.4
4	4.7	7.8	7.3	1.2	3.6	2.7	2.8	3.4	3.1
5	5.4	17.6	11.6	1.3	4.8	1.7	2.4	2.6	2.1
6	8.5	14.1	15.9	2.1	4.6	1.9	1.6	1.7	2.1
7	6.7	11.7	11.8	1.2	3.5	1.5	1.8	1.8	2.1
8	7.2	15.3	16.6	1.0	4.6	2.6	2.3	1.9	2.1
9	7.2	14.9	14.2	1.6	5.9	1.8	1.9	2.4	2.1
10	5.0	7.3	8.6	2.0	1.6	.6	2.2	1.8	2.4
TOTAL	5.5	11.7	13.1	1.5	3.5	2.0	2.4	2.6	2.3

[a] The category labeled "Both" includes boaters using both GL and IL waters in 1980.

[b] Quality scale is 1=excellent, 2=very good, 3=good, 4=fair, 5=poor, 6=very poor.

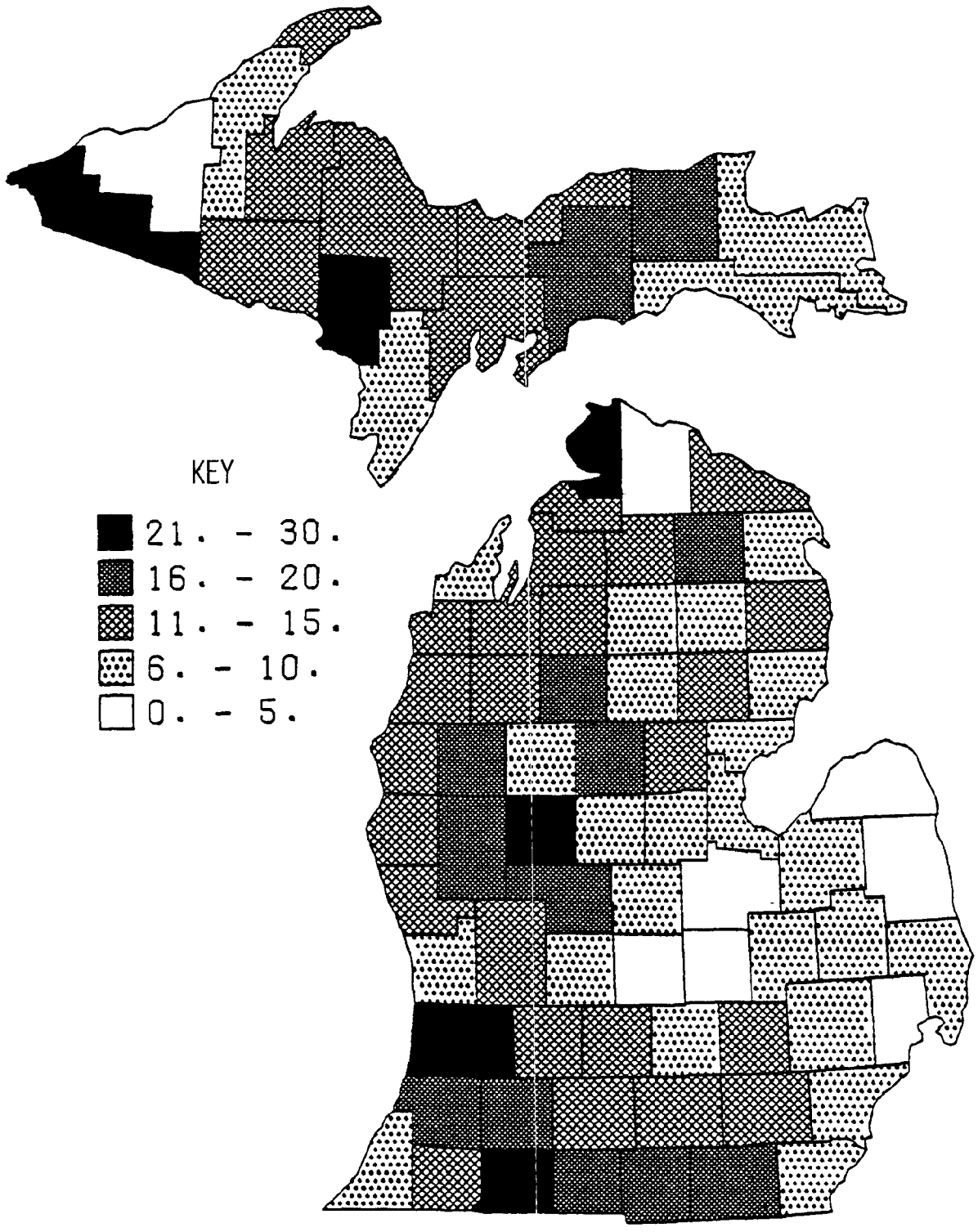


FIGURE 7. NUMBER OF BOATING OPPORTUNITIES WITHIN ONE HOUR OF HOME

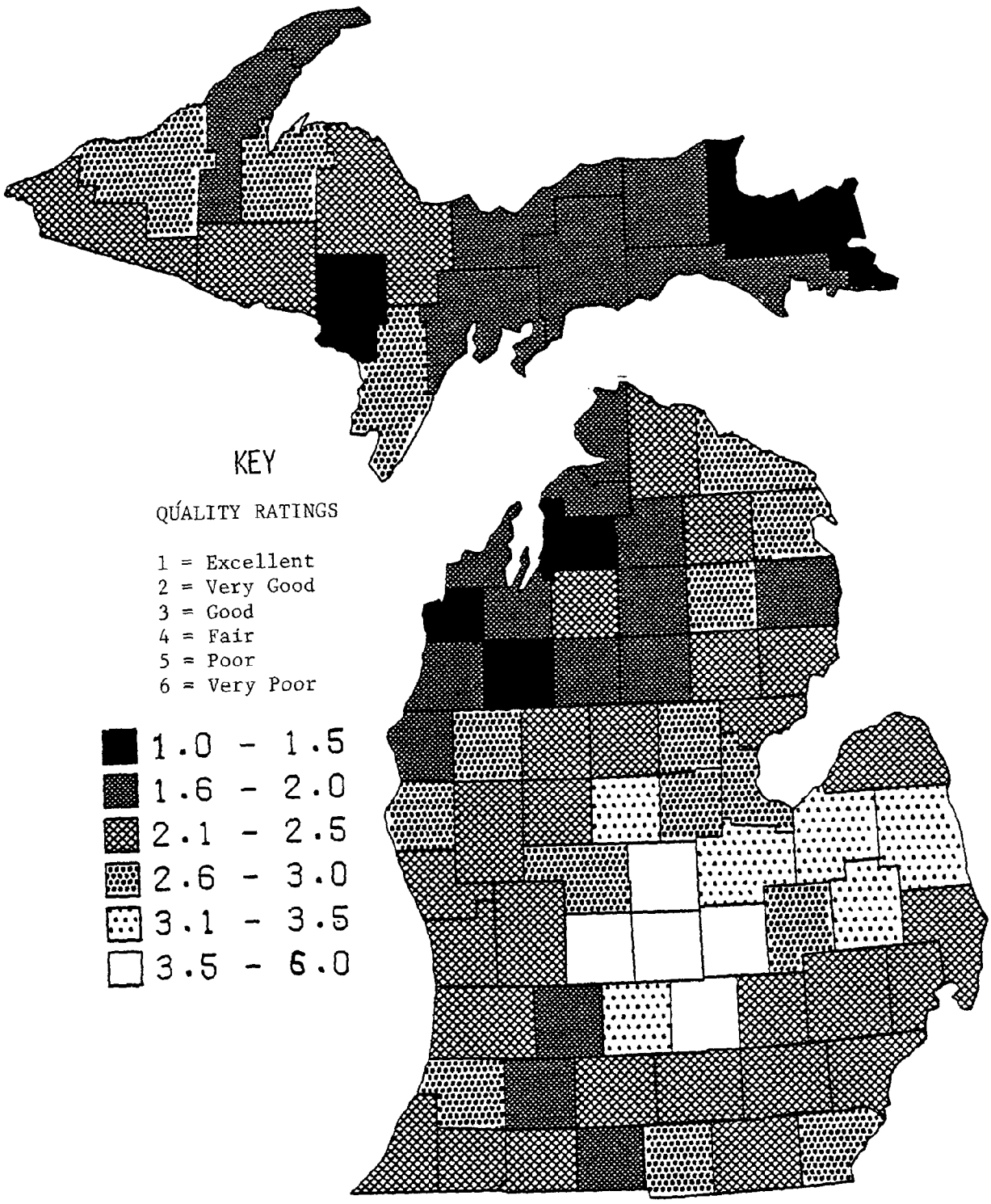


FIGURE 8. QUALITY OF BOATING OPPORTUNITIES WITHIN ONE HOUR OF HOME

CHAPTER IV

CHARACTERISTICS OF MICHIGAN'S REGISTERED BOAT OWNERS

In this chapter we provide a profile of the Michigan registered boat owner, report some preliminary market segments based upon the life cycle concept, and review boaters' history of involvement and reasons for boating. An understanding of the boater is critical to virtually all boating management, marketing, and planning decisions. A summary of boaters' comments and opinions from the survey provides a good picture of the concerns and issues on the minds of boaters in 1980.

Demographic and socioeconomic data have not been collected in Michigan's statewide boater survey since 1968. Since these variables were not included in the RECSYS-SYMAP planning model for predicting boating demand, they were generally not collected, and remain largely unreported even in the 1968 survey. With the abandonment of the RECSYS model for statewide planning, the increased diversification of the boating population, and the emphasis in 1980 upon marketing; these variables take on a renewed importance.

THE MICHIGAN REGISTERED BOAT OWNER IN 1980

The average registered boat owner is 50 years of age, a high school graduate, and has a median income of $23,000 (Table 20). Only

TABLE 20. DEMOGRAPHICS OF MICHIGAN BOAT OWNERS, 1980

	% of Total	Cum.%	
AGE			
≤ 20	2.0	2.0	
21-30	9.5	11.5	
31-40	19.5	31.0	MEDIAN = 49.7
41-50	21.6	52.6	MEAN = 48.9
51-60	23.0	75.6	
61-70	17.9	93.5	
71 +	6.4	100.0	
EDUCATION			
1-11	19.6	19.6	
12	37.1	56.7	MEDIAN = 12.3
13-16	31.7	88.4	MEAN = 13.0
17 +	11.6	100.0	
INCOME			
≤ 10,000	13.3	13.3	
10-14,999	14.2	27.5	
15-19,999	13.5	41.0	
20-24,999	17.6	58.6	MEDIAN = $22,556
25-29,999	11.7	70.3	
30-34,999	9.1	79.4	
35-39,999	6.0	85.4	
40,000 +	14.6	100.0	
HOUSEHOLD SIZE			
1	10.1	10.1	
2	36.9	47.0	
3	17.4	64.4	MEDIAN = 2.7
4	20.3	84.7	MEAN = 3.0
5	9.8	94.5	
6	3.6	98.1	
7	1.4	99.5	
8+	.5	100.0	
NUMBER OF CHILDREN UNDER 12			
0	73.5	73.5	
1	12.2	12.2	
2	10.2	10.2	MEDIAN = .2
3	3.5	3.5	MEAN = .5
4	.5	.5	
5	.1	.1	

two percent of Michigan's registered boat owners are non-white. Thirty percent own a second home or summer cottage, the majority with water-front access. The average boat owning family contains three people; one in four includes at least one child under 12 years of age. Thirty-seven percent of Michigan's registered boats are owned by two-person households.

Some differences were observed in the characteristics of owners of different types of boats (Table 21). Pontoon boat owners are the oldest, averaging 54 years of age. Sail boaters are the youngest and most highly educated group of boaters. Owners of small outboards and row boats have the longest history of boat ownership (over 15 years) and have owned their present boat for the longest period of time.

LIFE CYCLE SEGMENTS

The life cycle concept provides a convenient means of summarizing the boating population and suggests a promising approach to identifying demographically-based boater market segments. Life cycle indexes combine several demographic variables including marital status, age, number of children, and number and ages of children living at home. Sufficient data were collected in the 1980 survey to define seven distinct life cycle segments (Table 22). These life cycle groupings are highly correlated with disposable income, making them good indicators of likely boat purchase and participation patterns.

Boating is very much a family activity. The four largest boater life cycle segments are older families (19%), young families (17%),

TABLE 21. 1980 BOAT OWNER DEMOGRAPHICS BY BOAT TYPE CLASSIFICATIONS

BOAT CLASSIFICATION	MEAN AGE OF BOAT OWNER	MEAN YEARS OF SCHOOL	PERCENT OWNING SECOND HOME	MEAN NUMBER OF PERSONS IN HOUSEHOLD	MEAN NUMBER OF CHILDREN UNDER 12 YEARS OF AGE	MEAN YEARS OF OWNERSHIP OF CURRENT BOAT	MEAN YEARS OF TOTAL BOAT OWNERSHIP
Outboard Less than 16 feet long	49.8	12.9	32.0	3.0	.46	7.3	15.3
Outboard 16 or more feet long	46.7	13.1	31.6	3.2	.50	5.2	14.1
Cabin	48.1	13.7	23.8	3.1	.44	4.5	14.1
Sail	42.4	15.8	30.6	3.1	.62	5.5	13.1
Row	51.0	12.0	26.1	3.0	.46	8.6	15.2
Pontoon	53.8	13.0	44.9	2.7	.25	4.9	14.3
Average for all classes	48.9	13.0	30.9	3.0	.47	6.6	14.6

and two groups of "empty nesters", one aged 40-60 (13%) and another over 60 years of age (16%). The term "empty nester" is applied to couples whose children have grown up and left the household. Almost thirty percent of boat owning households fall into the empty nest category. Singles and young childless couples each account for about ten percent of Michigan's boating households (Table 22).

TABLE 22. MICHIGAN BOAT OWNER LIFECYCLE SEGMENTS

SEGMENT	% of Boaters	% of Those Classified	Income	Description
Singles	9.3	10.4	$17,000	1-person household
Young Couples	9.1	10.2	$22,000	2-adult households, no children
Young Families	17.4	19.5	$24,000	HOH[a] under 40, at least one child under 12
Intermediate Families	6.1	6.8	$25,000	HOH age 40-60, at least one child under 12
Older Families	18.7	21.0	$26,000	HOH age 40-60, at least one child, none under 12, "full nesters"
Empty Nesters I	12.7	14.2	$22,000	HOH age 40-60, no children living at home
Empty Nesters II	16.1	18.0	$14,000	HOH age 60+, no children living at home
Unclassified[b]	10.7	----	-------	----------

[a]HOH denotes "head of household", in this case the boat owner

[b]Unclassified category includes boaters with missing values for the variables that make up the index and some hard to categorize boaters

Since the life cycle is related to disposable income, family responsibilities, and age, we find it also reveals patterns of boat ownership and use (Table 23). Especially significant is the relationship between life cycle and a family's desire and ability to purchase a permanent home, a second home, or a large boat. Empty nesters and

TABLE 23. PROFILES OF MICHIGAN BOATERS USING LIFE CYCLE SEGMENTS

Segment [a]	Craft Type	Storage	Activity	% Owning 2nd Home	% Trans-porting	Avg. GL Boat Days	Avg. IL Boat Days
SINGLES	All Types	Other	Pleasure	26	50	11	22
YOUNG COUPLES	Cabin/Sail	Other/ Marina	Pleasure	20	69	15	21
YOUNG FAMILIES	Sail	Non-water-front home	All Types	15	73	10	24
INTERMEDIATE FAMILIES	Cabin	GL home, Marina	Pleasure/ Ski	32	67	12	19
OLDER FAMILIES	Larger Outboards	Summer homes	Ski	39	53	12	25
EMPTY NESTERS Age 40-60	Cabin/ Pontoon	All Types	All Types	41	51	9	26
EMPTY NESTERS Age 60+	Sm Outboard/ Row/Pontoon	Waterfront Home	Fish/ Pleasure	35	40	8	23

a. See Table 22 for definitions of segments

older families have the highest rates of second home ownership (both near 40%). Young families tend to trailer boats from nonwaterfront homes. Intermediate and older families keep their boats at second homes, while singles and young couples list "other" as their boat storage location. The latter response includes storage with friends and relatives, who may have waterfront homes.

As one passes through the life cycle stages, boating activity changes from pleasure boating, to multiple use, to waterskiing for families with older children, and then to fishing later in life. Sail boats are most popular among young families and couples. Older families have stepped up from small outboards and row boats to larger outboards, suitable for a variety of boating activities. Pontoon boats are popular with empty nesters.

Some of these patterns also reflect historical developments in boating. Preferences for different types of craft, locations, and boating activities are influenced by what was available and popular in the past. Younger boaters adopt new products and activities more readily than older boaters. Thus, we observe stronger preferences for sailing and GL boating in the younger age groups. Many older boaters have taken up residence at an inland lake and established patterns of boating that will not change rapidly. Pontoon boats and fishing are especially popular among older boaters. These historical patterns are explored more fully in the next section. A subsequent report will examine demographically-based boater market segments in more detail.

HISTORY OF BOAT OWNERSHIP

For thirty-five percent of Michigan's registered boaters, their present boat is their first boat. Half of these first boat owners purchased their boat within the past five years (Table 24). Boat owners, as a group, average almost 15 years of boat ownership and have owned their present boat for an average of 4.6 years (Table 25).

TABLE 24. YEARS OF BOAT OWNERSHIP OF 1980 MICHIGAN BOAT OWNERS

Years of Ownership	First Boat Owners		Previous Boat Owners		All Boat Owners	
	%	cum.%	%	cum.%	%	cum.%
1-2	23.1	23.1	1.1	1.1	8.5	8.5
3-4	19.6	42.7	5.4	6.5	10.1	18.6
5-6	11.2	54.0	9.0	15.5	9.8	28.4
7-8	8.8	62.8	6.5	21.9	7.3	35.7
9-10	12.3	75.0	12.2	34.1	12.2	47.9
11-15	11.8	86.8	17.6	51.7	15.6	63.6
16-20	6.9	93.7	16.8	68.6	13.5	77.0
21-25	3.0	96.7	10.6	79.2	8.0	85.0
26-63	3.3	100.0	20.8	100.0	15.0	100.0

Mean = 14.7 years

Median = 11.6 years

TABLE 25. YEARS OF OWNERSHIP OF PRESENT BOAT

Years	%	Cumulative %
1-2	26.7	26.7
3-4	22.2	48.9
5-6	14.3	63.2
7-8	9.6	72.8
9-10	9.5	82.8
11-15	9.3	91.6
16-20	5.2	96.8
21-25	1.9	98.7
26-63	1.3	100.0

The average age at the time of first boat purchase is 34, with over eighty percent of present boaters having entered the market between the ages of 20 and 50 (Figure 9). The likelihood of entry into the boat market is particularly high between the ages of 25 and 40. During the 1970's the population aged 25-34 exhibited the fastest growth rate nationally, increasing by almost fifty percent (Lazer, 1980). During the 1980's this growth will shift to the 35-44 year olds and then to the 45-54 year age group in the 1990's. These demographic trends promise a strong boat market until the end of the century.

Trend data on boat registration and sales in the 1960's and 70's show increases in both length and horsepower of boats. This suggests that boaters are moving up in both horsepower and size over time. In the 1980 survey boaters reported the characteristics of both their present and previous boat, providing an opportunity to directly test this hypothesis.

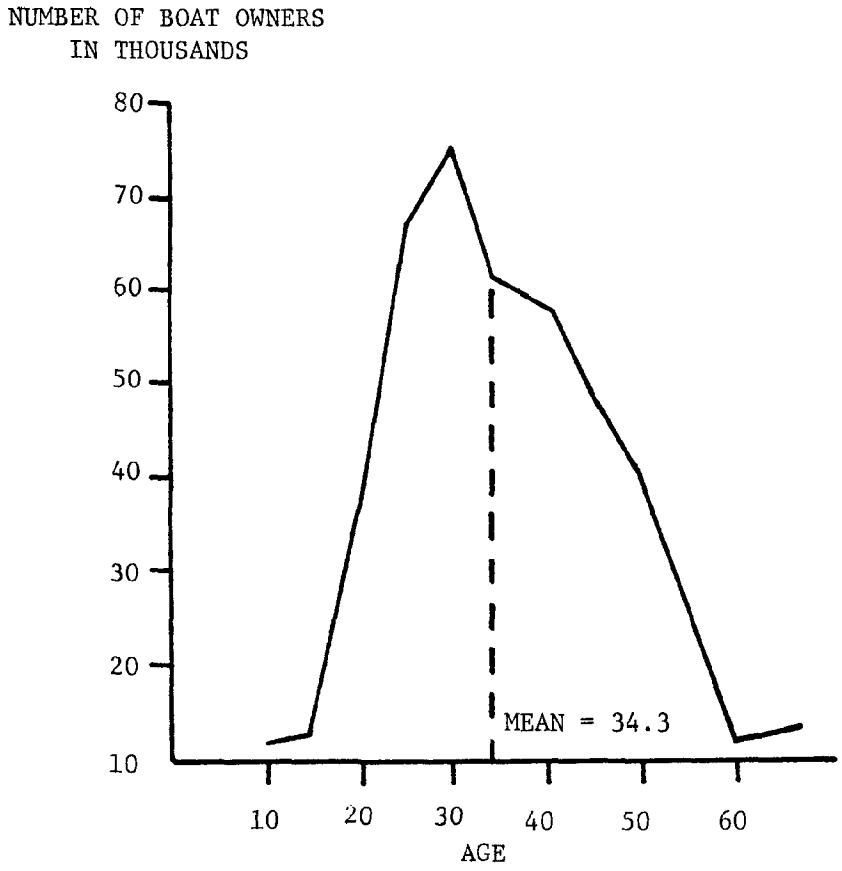


FIGURE 9. AGE AT TIME OF FIRST BOAT PURCHASE: MICHIGAN BOAT OWNERS

Table 26 summarizes reported changes in boats from previous to present craft for boat owners with previous boat ownership. These data suggest both upward and downward movements in boat purchases. Individuals with smaller craft and lower horsepower tend to purchase larger and more powerful boats in subsequent purchases. Those in intermediate categories tend to remain there, and those in the longer and more powerful groups show some downward movement in size and power. These patterns suggest an upward movement with increasing boating experience and a corresponding reduction in length and horsepower among older

TABLE 26. PREVIOUS AND CURRENT BOAT CHARACTERISTICS OF PERSONS WHO PREVIOUSLY OWNED WATERCRAFT

A. PREVIOUS AND CURRENT BOAT LENGTH

Length of Previous Craft	% Same Length	% Longer Craft	% Owning Shorter Craft
1-11	9.7	90.3	---
12-15	58.8	38.8	2.4
16-20	47.3	16.1	36.6
21+	24.2	13.3	62.5

B. PREVIOUS AND CURRENT HORSEPOWER

Previous Horsepower	% Same Horsepower	% More Horsepower	% Less Horsepower
1-10	32.5	65.2	2.3
11-20	12.8	56.1	31.1
21-40	22.8	56.3	30.9
41-60	17.0	43.5	39.5
61-80	13.8	42.5	43.7
81-100	10.5	50.0	39.5
100+	46.4	14.5	39.1

C. PERCENTAGE OF CURRENT CRAFT OF THE SAME BOAT TYPE AS PREVIOUS CRAFT

Boat Type	% Currently Owning Same Type of Craft
Open	76.8
Sail	62.6
Row	58.2
Cabin	44.3
Pontoon	35.7
Other	6.1

boaters with decreased income, smaller families, and more limited boating use.

Changes in craft type over time were also examined. Those groups most loyal to their present craft type were owners of open, sail, or row boats. Over half of the owners of these boat types repurchased a

similar craft. Only 44% of former cabin boat owners repurchased a cabin cruiser and only 35% of former pontoon boat owners purchased a second pontoon boat (Table 26). The most common change in type over time is from small outboards and row boats to larger outboards.

SECOND HOME OWNERSHIP

Since access to water is an important factor in second home location decisions, there is a close tie between second home ownership and boating. One in four registered boats is kept at a second home and all but two percent of these are waterfront locations. As a group, thirty percent of Michigan's registered boat owners also own a second home.

Eighty percent of the out-of-state boats registered in Michigan are owned by individuals with a second home (Table 27). Second home ownership within Michigan is highest in the four southern Michigan regions. Regions 1-4 and out-of-state boaters (Region 10) account for 89 percent of the second homes owned by registered boaters in Michigan. These second homes are predominantly located in Northeast, Northwest, and Southwest Michigan (Regions 5, 6, and 2 respectively) (Table 27).

The second home ownership patterns appear to explain much of the interregional flows of boaters, mostly from southern Michigan population centers to northern Michigan regions. Northwest Michigan (Region 6) is a popular second home location, drawing substantially from each of the four southern regions and out-of-state. Northeast Michigan (Region 5) draws most heavily from the eastern side of the state, i.e. the Thumb and SE-Michigan regions. At least half of the second home owners in Region 2 and 3 remain within the region, with the majority of those going outside of these two regions owning second homes in Region 6 (Figure 10).

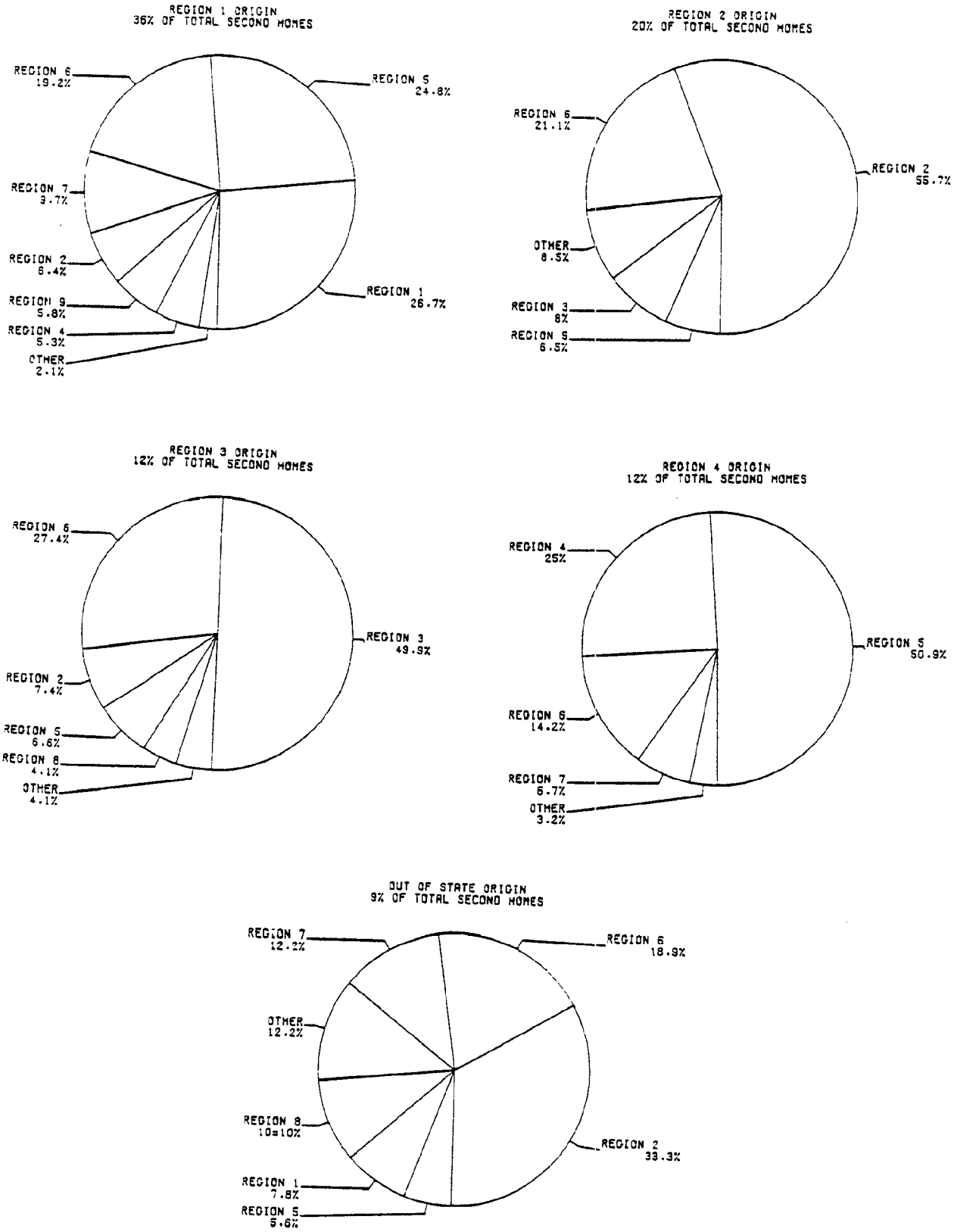


FIGURE 10. SECOND HOME OWNERSHIP BY REGION OF RESIDENCE

TABLE 27. SECOND HOME OWNERSHIP OF MICHIGAN BOAT OWNERS BY REGION

Region	Percent Owning Second Homes	Percent of Boater 2nd Homes Owned by Residents of Region	Percent of Boater 2nd Homes Located in the Region
1	32	36	11
2	32	20	18
3	30	12	9
4	28	12	6
5	13	1	18
6	17	4	21
7	17	2	8
8	29	3	5
9	25	1	3
10	80	9	1
TOTAL	30	100	100

Second home ownership among boaters is also closely tied to the family life cycle as we have seen in Table 23. Older families and empty nesters have the highest rates of second home ownership. Among the different craft types, pontoon boat owners have the highest second home ownership rate (45%) (Table 21).

REASONS FOR BOATING

An understanding of boater motivations is of potential use in marketing boat products and facilities as well as in planning access sites and marinas. As an initial step in identifying reasons for boating, 1980 survey respondents were asked to rate the importance of seven different motivations. Each reason for boating was rated as 1=very important,

2=moderately important, 3=somewhat important, 4=of little importance, or 5=not important.

For the sample as a whole, relaxation, nature enjoyment, being with friends and family, and fishing were rated between very and moderately important. Excitement was somewhat important, skills development between somewhat and little importance, and competition was of little importance (Table 28).

Boater motivations were compared for different subgroups of boaters including groups defined by activity, storage location, craft type, and GL vs IL users. Relaxation, nature enjoyment, and being with friends and family were important reasons for boating across all segments. Their almost universal importance makes these motivations of little use in discriminating between boaters. The four remaining reasons provide some possibilities for discriminating among boater types.

TABLE 28. REASONS FOR BOATING

Reason	Avg. Importance Rating[a]
to relax	1.55
to enjoy nature	1.81
to be with friends and family	1.82
for fishing	1.91
for the excitement	3.12
to develop skills	3.53
for competition and challenge	4.13

a. Importance scale: 1=very important, 2=moderately important, 3= somewhat important, 4=of little importance, 5=not important.

Motivations by Boat Type

The largest differences in motivations were observed among different types of craft. Boats are used for different purposes and underlying motivations appear to be expressed in the type of craft that is purchased. Sail boat owners obviously assign very low importance to fishing as a reason for boating. They also assign the highest ratings of any segment to competition, skills development, and excitement (Figure 11). Pontoon boaters are at the opposite extreme assigning the greatest importance to being with friends and family and relatively low importance to excitement, skills, or competition.

Owners of small outboards and row boats are similar in their motivations. These two groups assign the highest rating to fishing, the lowest to being with friends and relatives and fall just above pontoon boaters with respect to excitement, skills, and competition. The two remaining craft types, large outboards and cabin cruisers, can be grouped together. These two groups of boaters show similar motivations, lying in between sailers and the row/small outboard groups on most motivations (Figure 11).

Motivations by other groups

There were few other revealing differences in motivations when boaters were divided according to activity, storage, or use. Marina boaters tended to assign higher importance to all motivations with the single exception of fishing. This probably reflects the large percentage of sail boats kept at marinas. Fishermen obviously assigned high importance to fishing as a reason for boating.

Motivationally-based boater segments will be explored further in a

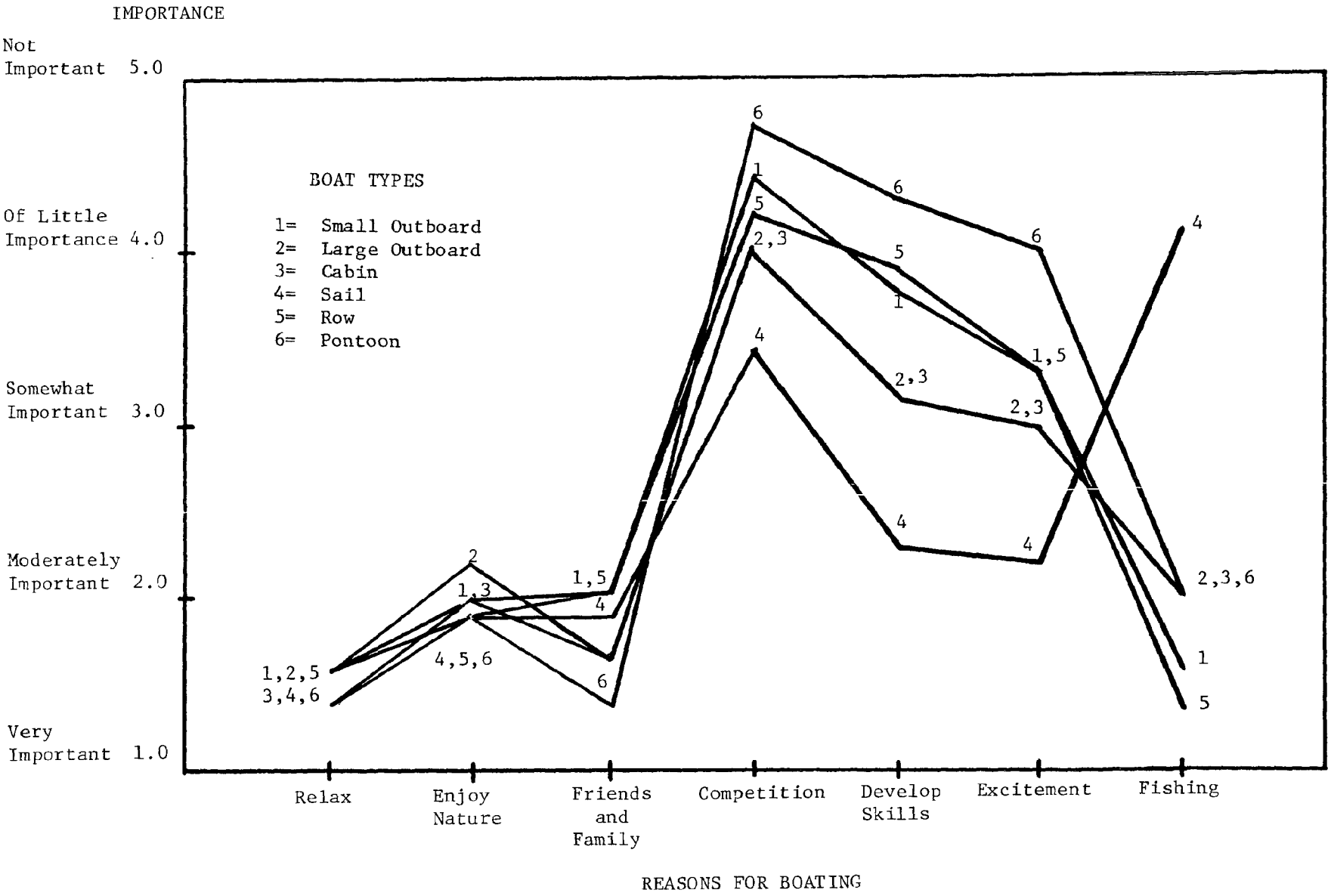


FIGURE 11. REASONS FOR BOATING BY CRAFT TYPE

subsequent report. Our preliminary conclusion is that boater differences in motivations are readily and easily explainable by demographic, activity, and craft related variables. Segments based upon these variables will probably be more understandable and useful to survey users.

BOATER OPINIONS AND COMMENTS

An open ended question was included at the end of the survey to provide respondents an opportunity to identify boating needs and problems. Over half of both active and inactive boaters listed at least one comment or problem, twenty percent volunteered at least two different opinions and ten percent identified three issues of concern. Content analysis procedures were used to code these responses into one of 51 specific categories. These are grouped into eight general problem areas in Table 29. A complete itemization of comments is included in Table 30.

Analyses of comments are unweighted and therefore reflect the sample, not the statewide boater population. Larger boats and northern regions are over-represented in the sample. Active boaters were more prone to give multiple comments as inactive boaters primarily gave a reason for not boating in 1980.

Of those inactive boaters completing the comments section of the questionnaire, about 10% indicated selling their boat. Cost constraints were cited by 15% of the inactive boaters with gasoline costs accounting for about half of these. Health reasons were given by about five percent of the inactive boaters as a reason for not boating in 1980.

For the sample as a whole, the most frequently cited problem was a need for more or better boating facilities. Over 15 percent of those

volunteering a comment requested additional boating access sites and launching facilities. Design problems in shore facilities and need for additional marinas/boat slippage were also important facilities problems. The second most important general concern seems to be regulations and boater behavior. Although 57 boaters wanted less control and regulation, the majority of comments favored more regulation to control use conflicts. Time zoning of speedboating and waterskiing to reduce conflicts with fishermen was the most frequently cited specific control measure. This was followed in importance by requests for horsepower and speed restrictions.

Although the thrust of the comments section was to elicit needs and problems from boaters, nine percent of the responses were general positive comments about boating in Michigan. Environmental concerns, law enforcement problems, and boating information and education programs were cited by approximately ten percent of those boaters completing the comments section. Table 30 gives a detailed breakdown of the responses to the comments question.

TABLE 29. 1980 BOATER SURVEY RESPONDENT OPINIONS AND COMMENTS

Opinion/Comment	Inactive Boaters		Active Boaters		Total Sample	
	No.	%	No.	%	No.	%
Boating Facilities	83	19	1039	32	1122	31
Personal Constraints (Cost, Health, etc.)	144	44	428	13	618	16
Regulations	28	6	453	14	481	13
Boater Behavior/Use Conflicts	44	10	392	12	436	12
General Positive Comment	42	10	287	9	329	9
Environmental Concerns (Water Quality, Fish)	17	4	258	8	275	8
Enforcement	21	5	213	7	234	6
Information/Education	9	2	161	5	170	5
TOTALS	434	100	3231	100	3665	100

TABLE 30 1980 BOATER SURVEY : COMMENTS AND OPINIONS

	Number	Percent
A. More or better enforcement/patrols		
General	163	4.5
Speed/ no wake	35	1.0
Noise	7	.2
Safety equip., inspection	16	.4
pollution	2	—
B. More or better regulation and control		
Time zoning of speedboating & waterski	92	2.5
Horsepower restrictions	85	2.3
Other zoning	42	1.1
licensing of boat operators	52	1.4
Noise	34	.9
Minimum age to operate boat	9	.2
less control/regulation	57	1.6
General	103	2.8
C. More or better information/education		
General	66	1.8
Signs for PAS sites	18	.5
Signs (other)	16	.4
Boater training/safety courses	71	2.0
D. More or better boating facilities		
General	154	4.2
Slips, moorings, marinas, docks	147	4.0
launch sites, ramps, PAS sites	274	7.5
navigation aids (buoys, markers etc)	60	1.6
maintenance of shore facilities	49	1.3
design of shore facilities	200	5.5
safer harbors, hazard removal	99	2.7
parking	77	2.1
pumpout facilities	37	1.0
gas dealers		
E. Boater behavior/ Use conflicts		
General	90	2.5
Speed	89	2.5
Noise	21	.6
Boats too close to swim areas/other boats	58	1.6
Overcrowding	50	1.4
Drinking	7	.2
waterskiers	39	1.1
outsiders/weekend behavior	35	1.0
inappropriate use of launch sites	4	.1
boater ignorance of rules	45	1.2
F. More or better resource management		
General	12	.3
Water quality	65	1.8
Weed control	37	1.0
Fisheries	105	2.9
Commercial/indian fishing	55	1.5

	Number	Percent
G. Constraints to boating		
General	19	.5
Cost, general	56	1.5
Cost of marinas, launch facilities	56	1.5
Cost of gasoline	69	1.9
Cost of boat registration	45	1.2
Age/Health	28	.7
Sold Boat	32	.9
H. General Positive Comment	326	8.9
I. General negative unclassified[a]	303	8.3

[a]Not included in Table 29.

CHAPTER V

1980 BOATING IN MICHIGAN

Michigan's registered boating fleet logged 16.9 million boat days in 1980. Thirty-two percent of this activity took place on the Great Lakes and connecting waters while 68 percent took place on inland lakes and streams (Table 31). Boats under twenty feet in length accounted for 71 percent of GL use and 91 percent of IL use. Total boating activity increased from 1977 levels by 23 percent. The largest increases were observed in small boat activity, particularly on the GL. This was a reversal of the trend toward more large boat activity prior to 1977 (Table 32).

TABLE 31. 1980 MICHIGAN RECREATIONAL BOATING BY SIZE CLASS

Boat Days (000's) Row Percent Column Percent Percent of Total	GREAT LAKES	INLAND LAKES	TOTAL
Boats Under 20 feet in length	3,788	10,546	14,344
	26.4	73.6	100.0
	70.8	91.1	84.7
	22.4	62.3	
Boats 20 feet and more in length	1,563	1,028	2,591
	60.3	39.7	100.0
	29.2	8.9	15.3
	9.2	6.1	
TOTAL	5,351	11,574	16,925
	31.6	68.4	100.0

TABLE 32. TRENDS IN BOAT USE ON GREAT LAKES AND INLAND LAKES, 1974-80

	1974 Boat Days (000's)	1977 Boat Days (000's)	1974-77 % Change	1980 Boat Days (000's)	1977-80 % Change
GREAT LAKES					
Small Boats (≤20 feet)	2,293	2,849	24	3,788	33
Large Boats (>20 feet)	982	1,573	60	1,563	- 1
TOTAL	3,275	4,422	35	5,351	21
INLAND LAKES					
Small Boats (≤20 feet)	6,978	8,475	21	10,546	24
Large Boats (>20 feet)	386	885	129	1,028	16
TOTAL	7,364	9,361	27	11,574	24
GRAND TOTAL	10,639	13,783	29	16,925	23

Fishing is the most popular boating activity, accounting for 52 percent of all boat days in 1980. Pleasure boating (35%) and waterskiing (11%) are the two principal boating activities. The primary difference between GL and IL boating activity is a greater percentage of waterskiing on IL and a corresponding greater emphasis upon fishing in GL waters. Since 1968, fishing has increased from 44 percent to 57 percent of all GL boating. Waterskiing has declined from about 14 percent of boating activity in 1968 to ten percent in 1980 (Table 33).

TABLE 33. TRENDS IN BOATING ACTIVITY ON GREAT LAKES AND INLAND LAKES, 1968-1980

ACTIVITY	GREAT LAKES		INLAND LAKES	
	1968	1980	1968	1980
	percent of boat days			
Fishing	44	57	52	49
Cruising/Pleasure Boating	40	35	25	35
Waterskiing	8	5	18	13
Other	8	3	5	3

FREQUENCY OF BOATING

The fact that boat days are increasing more rapidly than the number of registered boats indicates that boaters are boating more often. Boaters averaged 33 days of boating in 1980 (Table 34).

TABLE 34. FREQUENCY OF BOATING BY USE OF GREAT LAKES vs INLAND LAKES

Boats Using ...	GL Boat Days	IL Boat Days	Total Boat Days
	average number of boat days per boat		
GL ONLY	33	0	33
BOTH GL & IL	20	26	46
IL ONLY	0	32	32
ALL BOATS	11	23	33

Some types of boaters were more active than others. Boaters taking advantage of both GL and IL waters averaged 46 boat days in 1980. Cabin cruisers were the most active on the GL while pontoon boats had the highest frequency of boating on inland waters (Table 35).

TABLE 35. AVERAGE NUMBER OF 1980 BOAT DAYS BY CRAFT TYPE FOR GREAT LAKES AND INLAND LAKES BOATERS

Craft Type	GL Boaters [a]	IL Boaters [a]	All Boaters
Cabin	42	20	43
Pontoon	26	40	39
Large Outboard	28	33	38
Sail	32	31	36
Small Outboard	22	29	30
Row	17	28	28

a. Averages include only days on GL for GL boaters and days on IL for inland boaters.

Boats stored at waterfront sites were considerably more active than boats stored at non-waterfront locations (Table 36). In particular, boats kept at marinas and GL waterfront storage locations were very active on the GL, and boats stored at IL waterfront locations were the most active on IL.

Regionally, out-of-state boaters were the most active group, reflecting the high rate of second home ownership and waterfront storage among out-of-state registered boaters. Southeastern Michigan boaters were the most active in-state group of boaters. Regional differences

in boating frequency are correlated with boater's evaluation of the quality and quantity of boating opportunities. Thus, southwestern Michigan boaters are the least active on the GL, while northwest Michigan boaters are the most active (Table 37).

TABLE 36. AVERAGE NUMBER OF 1980 BOAT DAYS BY STORAGE CATEGORY FOR GREAT LAKES AND INLAND LAKES BOATERS

Summer Storage	GL Boaters [a]	IL Boaters [a]	All Boaters
Marina	46	29	47
IL permanent home	14	42	42
IL summer home	15	40	40
GL home	37	27	39
Non-waterfront home	20	19	23

a. Averages include only days on GL for GL boaters and days on IL for inland boaters.

The average of 33 boat days per boat in 1980 is somewhat inflated by the group of heavy users (median number of boat days is 22). Ten percent of the active boaters report over 90 days of boating in 1980. Sixty percent report 30 or fewer days (Table 38). The convenience of waterfront access and storage clearly stimulates boating activity. The growth of the GL fisheries has also extended the boating season from early spring through late fall. The larger percentages of retirees with time and access to boating also contributes to the increases in boat days.

While the number of boat days increased by 23 percent between 1977 and 1980, less than one in four 1980 boaters indicated an increase in boating frequency over 1979. The remainder were split evenly between those boating less often and those reporting no change (Table 39).

TABLE 37. FREQUENCY OF GREAT LAKES AND INLAND LAKES BOATING BY REGION

Region	GL Boaters [a]	Inland Boaters [a]	All Boating
	----------Boat Days----------		
1	31	33	37
2	19	32	32
3	24	30	32
4	23	23	27
5	25	29	31
6	34	28	34
7	29	32	35
8	26	25	32
9	28	22	31
10	35	45	46
TOTAL	27	31	33

a. Averages include only days on GL for GL boaters and days on IL for IL boaters. The averages in "all boating" column are generally larger than either GL or IL since they include total boat days for boaters who use either GL only, IL only, or both GL & IL.

In conjunction with other findings in the 1980 survey, this suggests a significant increase in boating between 1977 and 1979 and then a drop in 1980 in response to economic factors including higher gasoline costs.

TABLE 38. FREQUENCY OF BOATING ON GREAT LAKES AND INLAND LAKES

Number of Boat Days	GL Boating [a]	IL Boating [a]	All Boating
	Percent		
1 - 10	31.8	18.2	21.5
11 - 20	21.1	29.4	20.5
21 - 30	15.4	17.3	17.6
31 - 40	7.8	8.2	9.4
41 - 50	5.2	4.6	5.5
51 - 60	5.2	4.8	6.2
61 - 70	2.0	1.4	2.3
71 - 80	1.7	1.6	2.1
81 - 90	2.3	4.1	3.7
90+	7.2	8.9	10.4

a. GL boating includes days on the GL for boaters who used the Great Lakes in 1980. IL boating is defined similarly. The "All Boating" column includes all boaters and represents the sum of GL and IL boat days.

TABLE 39. CHANGES IN FREQUENCY OF BOATING BETWEEN 1979 AND 1980

Response	Percent
Boated less often in 1980	38.1
No change in frequency	38.4
Boated more often in 1980	23.4

BOATING ORIGIN-DESTINATION PATTERNS

Boating travel patterns in 1980 did not change significantly from previous years. Only one in four boaters reported a change in boating location between 1979 and 1980 (Table 40). Of those making a change, the majority reported boating closer to home. Boaters with waterfront storage tend to boat primarily at these storage locations. A great deal of boating activity is tied to second homes and marinas. The geographic distribution of these storage locations does not change significantly from year to year, providing a degree of stability in boating activity. Boaters trailering their boats tend to remain close to home. This activity therefore mirrors population distributions or the distribution of registered craft.

Southeast Michigan generated 38 percent of all boat days in 1980 and almost half of all GL boat days. Southwest Michigan is a popular inland lake boating region generating about a quarter of all inland lake boat days in the state and receiving 27 percent of inland boat days. The Straits region and Northwest Michigan are the largest net importers of boat days receiving about twice as many boat days as they generate (Figure 12).

TABLE 40. CHANGES IN DISTANCE TRAVELED FOR BOATING BETWEEN 1979 and 1980

Response	Percent
Boated closer to home in 1980	19.2
No change	72.5
Boated further from home in 1980	8.3

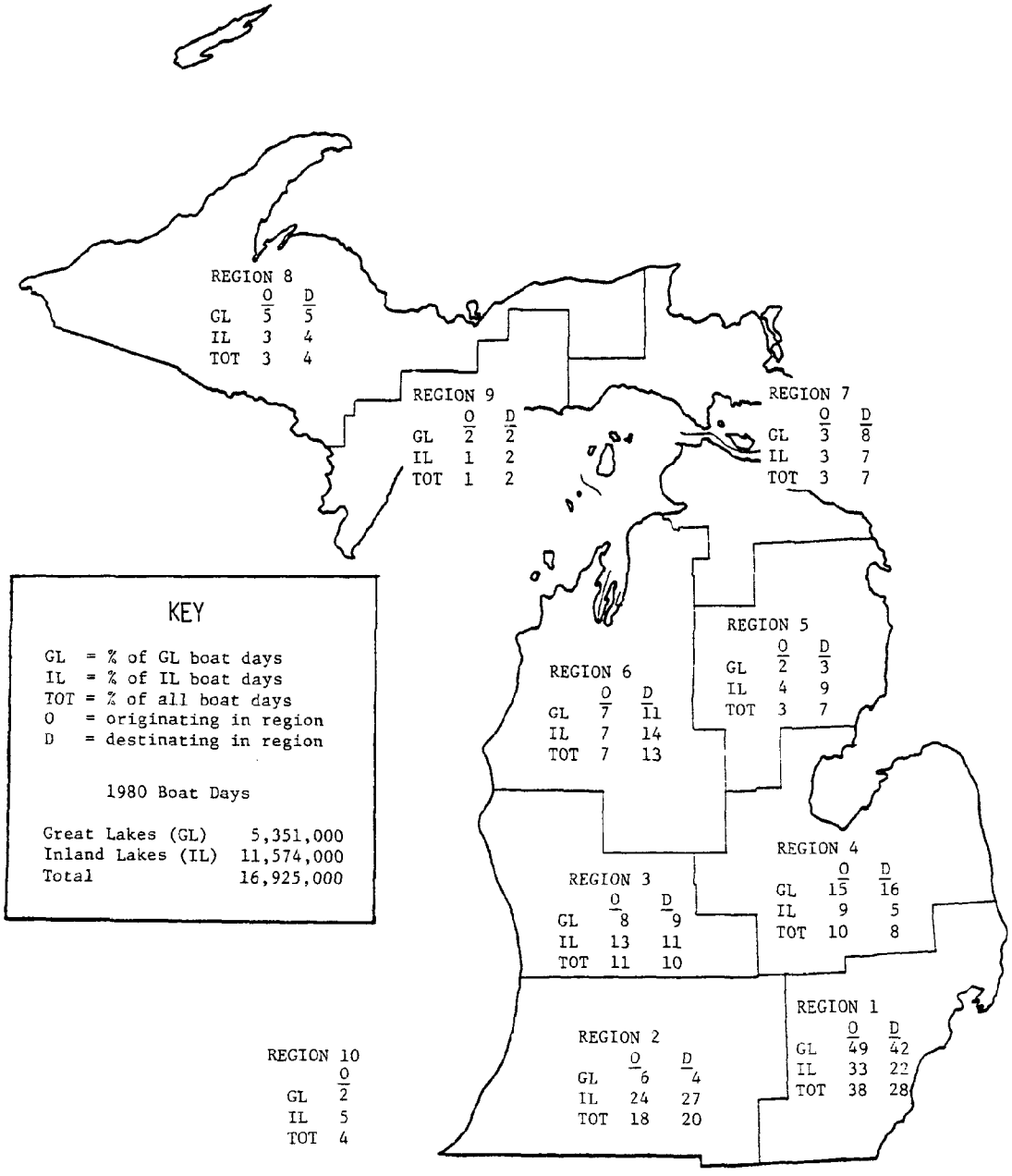


FIGURE 12. PERCENT OF BOAT DAYS BY REGION OF ORIGIN AND REGION OF DESTINATION

Tables 41-43 report estimates of 1980 boat days by county of destination in Michigan. Macomb, Wayne, and St. Clair Counties account for almost 39 percent of GL boat days in the state. These are followed in importance by counties on Saginaw Bay, western Michigan counties of Ottawa and Muskegon, and then northern counties (Table 41). Oakland County accounts for 9.7 percent of all inland boat days, about double that of any other county. Livingston, Roscommon, Barry, Jackson and Cass Counties exceeded 400,000 inland boat days in 1980 (Table 42). Only Wayne County is included in both GL and IL top twenty. When GL and IL boating is combined, Oakland, Wayne, and Macomb Counties each provide over 800,000 boat days. Cheboygan County is the only northern county in the state's top ten.

Tables 44-46 report regional origin-destination matrices for GL, IL, and total boating in Michigan. Almost half of all GL boat days originate in SE Michigan. Eighty-two percent of these GL boat days remain within the region. Regions 4, 7, and 6 are the primary export markets for southern Michigan boaters (Table 44). We suspect that a significant portion of boat days leaving the region are associated with second home locations. The reader may note the similarity in the boat origin-destination matrices and Figure 10, which depicts second home locations. Southwest Michigan exports 48 percent of its GL boat days, the majority going to West central Michigan and Northwest Michigan regions. GL boaters originating in northern Michigan tend to boat within their region of residence.

Southeast Michigan generates about a third of IL boat days. Of the 62 percent remaining within the region, Oakland and Livingston Counties

are the primary destinations. Region 1 exports IL boating to Regions 2, 5, and 6. Southwest Michigan retains 85 percent of its IL boat days within the region. The Thumb region has the poorest IL boating opportunities and exports 61 percent of its IL boat days. The Thumb region boater is a heavy user of Northeast Michigan IL, sending thirty percent of its boat days to that region. Northern regions keep most of the IL boat days they generate within the region (Table 45).

TABLE 41. RANKING OF MICHIGAN COUNTIES BY 1980 GREAT LAKES BOAT DAYS-DESTINATION

Rank	County Name	Boat Days	Percent of Total	Cumulative Percent
1	Macomb	779,037	14.6	14.6
2	Wayne	718,199	13.4	28.0
3	St. Clair	551,762	10.3	38.3
4	Huron	369,183	6.9	45.2
5	Bay	244,517	4.6	49.8
6	Ottawa	228,518	4.3	54.0
7	Monroe	185,896	3.5	57.5
8	Muskegon	184,065	3.4	60.9
9	Mackinac	168,930	3.2	64.1
10	Arenac	157,731	2.9	67.0
11	Grand Traverse	143,861	2.7	69.7
12	Chippewa	123,004	2.3	72.0
13	Manistee	102,410	1.9	73.9
14	Charlevoix	101,621	1.9	75.8
15	Berrien	100,543	1.9	77.7
16	Delta	96,140	1.8	79.5
17	Leelanau	93,228	1.7	81.3
18	Iosco	90,827	1.7	83.0
19	Houghton	71,862	1.3	84.3
20	Sanilac	67,638	1.3	85.6
21	Marquette	66,472	1.2	86.8
22	Allegan	65,622	1.2	88.0
23	Alpena	62,859	1.2	89.2
24	Antrim	56,615	1.1	90.3
25	Oceana	55,464	1.0	91.3
26	Emmet	54,856	1.0	92.3
27	Benzie	54,708	1.0	93.3
28	Cheboygan	49,802	1.0	94.3
29	Keweenaw	47,307	.9	95.2
30	Van Buren	40,628	.8	95.9
31	Mason	38,928	.7	96.6
32	Baraga	34,363	.6	97.3
33	Alcona	30,693	.6	97.9
34	Alger	29,923	.6	98.4
35	Shiawassee	15,167	.3	98.7
36	Menominee	13,986	.3	99.0
37	Presque Isle	13,897	.3	99.2
38	Luce	13,145	.2	99.5
39	Ontonagon	12,130	.2	99.7
40	Schoolcraft	10,891	.2	99.9
41	Gogebic	5,239	.1	100.0
TOTAL		5,351,671	100.0	

TABLE 42. RANKING OF MICHIGAN COUNTIES BY 1980 INLAND LAKES BOAT DAYS-DESTINATION

Rank	County Name	Boat Days	Percent of Total	Cumulative Percent
1	Oakland	1,121,932	9.7	9.7
2	Livingston	552,919	4.8	14.5
3	Barry	490,294	4.2	18.7
4	Jackson	466,446	4.0	22.7
5	Cass	417,630	3.6	26.3
6	Roscommon	364,675	3.2	29.5
7	Cheboygan	319,393	2.8	32.3
8	St. Joseph	316,595	2.7	35.0
9	Washtenaw	311,897	2.7	37.7
10	Van Buren	305,484	2.6	40.3
11	Kalamazoo	296,754	2.6	42.9
12	Newaygo	295,015	2.5	45.4
13	Kent	289,298	2.5	47.9
14	Branch	287,073	2.5	50.4
15	Genesee	285,064	2.5	52.9
16	Montcalm	262,398	2.3	55.1
17	Lenawee	254,397	2.2	57.3
18	Clare	184,393	1.6	58.9
19	Mecosta	184,188	1.6	60.5
20	Wayne	182,788	1.6	62.1
21	Allegan	182,086	1.6	63.7
22	Antrim	180,571	1.6	65.2
23	Grand Traverse	172,931	1.5	66.7
24	Muskegon	153,723	1.3	68.0
25	Gladwin	152,605	1.3	69.4
26	Schoolcraft	149,770	1.3	70.7
27	Ogemaw	146,835	1.3	71.9
28	Ottawa	137,502	1.2	73.1
29	Leelanau	137,497	1.2	74.3
30	Calhoun	136,421	1.2	75.5
31	Berrien	130,550	1.1	76.6
32	Mason	126,456	1.1	77.7
33	Otsego	121,218	1.0	78.8
34	Presque Isle	118,789	1.0	79.8
35	Iosco	113,589	1.0	80.8
36	Charlevoix	108,522	.9	81.7
37	Lapeer	105,509	.9	82.6
38	Benzie	102,455	.9	83.5
39	Montmorency	99,902	.9	84.4
40	Marquette	97,599	.8	85.2
41	Oceana	95,363	.8	86.0
42	Emmet	94,323	.8	86.9
43	Alcona	91,948	.8	87.6

TABLE 42 (Continued)

Rank	County Name	Boat Days	Percent of Total	Cumulative Percent
44	Lake	90,093	.8	88.4
45	Wexford	87,328	.8	89.2
46	Mackinac	81,953	.7	89.9
47	Iron	77,832	.7	90.6
48	Manistee	77,737	.7	91.2
49	Kalkaska	74,899	.6	91.8
50	Gogebic	66,085	.6	92.4
51	Missaukee	56,306	.5	92.9
52	Ionia	54,723	.5	93.4
53	Luce	50,045	.4	93.8
54	Alpena	49,678	.4	94.3
55	Osceola	48,415	.4	94.7
56	Isabella	41,845	.4	95.1
57	Delta	37,652	.3	95.4
58	Houghton	34,031	.3	95.7
59	Tuscola	33,155	.3	96.0
60	Oscoda	32,681	.3	96.3
61	Ingham	30,746	.3	96.6
62	Midland	30,334	.3	96.9
63	Macomb	30,136	.2	97.1
64	Dickinson	28,903	.2	97.3
65	Crawford	28,418	.2	97.5
66	St. Clair	26,830	.2	97.7
67	Menominee	26,478	.2	97.9
68	Alger	25,997	.2	98.1
69	Eaton	23,819	.2	98.3
70	Chippewa	22,141	.2	98.5
71	Hillsdale	21,870	.2	98.7
72	Saginaw	18,886	.2	98.9
73	Bay	18,818	.2	99.1
74	Arenac	18,646	.2	99.3
75	Ontonagon	17,217	.1	99.4
76	Clinton	15,982	.1	99.5
77	Gratiot	15,141	.1	99.6
78	Monroe	9,639	.1	99.7
79	Huron	8,902	.1	99.8
80	Shiawassee	7,020	.1	99.9
81	Keweenaw	5,155	.0	99.9
82	Baraga	3,297	.0	99.9
83	Sanilac	679	.0	100.0
TOTAL		11,574,309	100.0	

TABLE 43. RANKING OF MICHIGAN COUNTIES BY 1980 TOTAL BOAT DAYS-DESTINATION

Rank	County Name	Total Boat Days	Percent of Total	Cumulative Percent
1	Oakland	1,121,932	6.6	6.6
2	Wayne	900,987	5.3	11.9
3	Macomb	809,173	4.8	16.7
4	St. Clair	578,592	3.4	20.1
5	Livingston	552,397	3.3	23.4
6	Barry	490,294	2.9	26.3
7	Jackson	466,446	2.7	29.0
8	Cass	417,630	2.5	31.5
9	Huron	378,085	2.2	33.7
10	Cheboygan	369,195	2.2	35.9
11	Ottawa	366,020	2.2	38.1
12	Roscommon	364,675	2.2	40.3
13	Van Buren	346,112	2.0	42.3
14	Muskegon	337,788	2.0	44.3
15	Grand Traverse	316,792	1.9	46.2
16	St. Joseph	316,595	1.9	48.1
17	Washtenaw	311,897	1.8	49.9
18	Kalamazoo	296,754	1.8	51.6
19	Newaygo	295,015	1.7	53.3
20	Kent	289,298	1.7	55.0
21	Branch	287,073	1.7	56.7
22	Genesee	285,064	1.7	58.4
23	Bay	263,335	1.6	60.0
24	Montcalm	262,398	1.6	61.6
25	Lenawee	254,397	1.5	63.1
26	Mackinac	250,883	1.5	64.6
27	Allegan	247,708	1.5	66.1
28	Antrim	237,186	1.4	67.5
29	Berrien	231,093	1.3	68.8
30	Leelanau	230,725	1.3	70.1
31	Charlevoix	210,143	1.2	71.3
32	Iosco	204,416	1.2	72.5
33	Monroe	195,535	1.2	73.7
34	Clare	184,393	1.1	74.8
35	Mecosta	184,188	1.1	75.9
36	Manistee	180,147	1.1	77.0
37	Arenac	176,377	1.0	78.0
38	Mason	165,384	1.0	79.0
39	Marquette	164,071	1.0	80.0
40	Schoolcraft	160,661	1.0	81.0
41	Benzie	157,163	.9	81.9
42	Gladwin	152,605	.9	82.8
43	Oceana	150,827	.9	83.7

TABLE 43 (Continued)

Rank	County Name	Total Boat Days	Percent of Total	Cumulative Percent
44	Emmet	149,179	.9	84.6
45	Ogemaw	146,835	.9	85.5
46	Chippewa	145,145	.9	86.4
47	Calhoun	136,421	.8	87.2
48	Delta	133,792	.8	88.0
49	Presque Isle	132,686	.8	88.8
50	Alcona	122,641	.7	89.5
51	Otsego	121,218	.7	90.2
52	Alpena	112,537	.6	90.8
53	Houghton	105,893	.6	91.4
54	Lapeer	105,509	.6	92.0
55	Montmorency	99,902	.6	92.6
56	Lake	90,093	.5	93.1
57	Wexford	87,328	.5	93.6
58	Iron	77,832	.5	94.1
59	Kalkaska	74,899	.4	94.5
60	Gogebic	71,324	.4	94.9
61	Sanilac	68,317	.4	95.3
62	Luce	63,190	.4	95.7
63	Missaukee	56,306	.3	96.0
64	Alger	55,920	.3	96.3
65	Ionia	54,723	.3	96.6
66	Keweenaw	52,462	.3	96.9
67	Osceola	48,415	.3	97.2
68	Tuscola	48,322	.3	97.5
69	Isabella	41,845	.3	97.8
70	Menominee	40,464	.2	98.0
71	Baraga	37,660	.2	98.2
72	Oscoda	32,681	.2	98.4
73	Ingham	30,746	.2	98.6
74	Midland	30,334	.2	98.8
75	Ontonagon	29,347	.2	99.0
76	Dickinson	28,903	.2	99.2
77	Crawford	28,418	.2	99.4
78	Eaton	23,819	.1	99.5
79	Hillsdale	21,870	.1	99.6
80	Saginaw	18,886	.1	99.7
81	Clinton	15,982	.1	99.8
82	Gratiot	15,141	.1	99.9
83	Shiawassee	7,020	.0	100.0
TOTAL		16,925,980	100.0	

TABLE 44. ORIGIN DESTINATION MATRIX - GREAT LAKES BOATING

Region of Residence	Boat Days[a] (000's) Row Pct. Column Pct.	Region of Destination 1	2	3	4	5	6	7	8	9	Totals
1		2155	9	27	175	25	81	109	19	18	2620
		82	0	1	7	1	3	4	1	1	100
		96	4	6	21	14	14	26	7	15	49
2		11	160	60	8	8	26	20	2	1	306
		4	52	20	3	3	12	6	1	0	100
		1	77	13	1	4	6	5	1	1	6
3		3	17	330	19	1	56	20	2	6	454
		1	4	73	4	0	12	4	0	1	100
		0	8	71	2	1	9	5	1	5	8
4		45	1	7	633	59	48	16	0	0	811
		6	0	1	78	7	6	2	0	0	100
		2	1	2	74	32	8	4	0	0	15
5		4	1	0	9	86	3	7	3	0	113
		4	1	0	8	76	2	6	2	0	100
		0	0	0	1	47	0	2	1	0	2
6		6	0	6	6	0	340	41	1	0	401
		2	0	2	1	0	85	10	0	0	100
		0	0	1	1	0	75	10	0	0	7
7		1	0	0	0	0	1	172	1	0	176
		0	0	0	0	0	1	98	1	0	100
		0	0	0	0	0	0	42	0	0	3
8		5	0	1	3	0	1	1	237	5	253
		2	0	0	1	0	0	0	94	2	100
		0	0	0	0	0	0	0	85	4	5
9		0	0	0	0	0	1	3	7	91	102
		0	0	0	0	0	0	3	7	90	100
		0	0	0	0	0	0	1	2	75	2
10		4	18	36	1	4	25	21	7	0	116
		4	16	31	0	4	22	18	6	0	100
		0	9	8	0	2	4	5	2	0	2
Totals		2235	207	468	854	184	591	410	279	121	5350
% of Total		42	4	9	16	3	11	8	5	2	100.0

TABLE 45. ORIGIN DESTINATION MATRIX - INLAND LAKES BOATING

Region of Residence	Boat Days[a] (000's) / Row Pct. / Column Pct.	Region of Destination 1	2	3	4	5	6	7	8	9	Totals
1		2393	407	18	86	255	388	210	24	49	3831
		62	11	0	2	7	10	5	1	1	100
		96	13	1	16	24	23	28	6	23	33
2		24	2314	81	10	42	167	36	13	33	2721
		1	85	3	0	2	6	1	0	1	100
		1	75	6	2	4	10	5	3	15	24
3		0	62	1093	54	32	175	31	8	9	1465
		0	4	75	4	2	12	2	1	1	100
		0	2	84	10	3	10	4	2	4	13
4		15	53	67	374	282	106	42	9	7	956
		2	6	7	39	30	11	4	1	1	100
		1	2	5	69	26	6	6	2	3	9
5		3	12	1	9	410	5	14	6	0	461
		1	3	0	2	89	1	3	1	0	100
		0	0	0	2	38	0	2	1	0	4
6		0	12	15	0	7	719	17	10	1	782
		0	2	2	0	1	92	2	1	0	100
		0	0	1	0	1	43	2	2	0	7
7		0	7	0	0	16	0	338	3	3	367
		0	2	0	0	4	0	92	1	1	100
		0	0	0	0	1	0	45	1	1	3
8		5	0	0	0	1	6	2	258	22	293
		2	0	0	0	0	2	1	88	7	100
		0	0	0	0	0	0	0	64	10	3
9		0	0	0	0	0	1	2	14	80	96
		0	0	0	0	0	1	2	15	83	100
		0	0	0	0	0	0	0	3	37	1
10		51	237	28	9	34	108	64	61	10	603
		8	39	5	1	6	18	11	10	2	100
		2	8	10	2	3	6	9	15	5	5
Totals		2491	3106	1304	542	1080	1674	758	406	214	11575
% of Total		22	27	11	5	9	14	7	4	2	100.0

TABLE 46. ORIGIN DESTINATION MATRIX - ALL MICHIGAN BOATING

Boat Days[a] (000's) Row Pct. Column Pct.		Region of Destination 1	2	3	4	5	6	7	8	9	Totals
Region of Residence		4548	417	45	262	280	469	319	43	67	6450
	1	71	6	1	4	4	7	5	1	1	100
		96	13	3	19	22	21	27	6	20	38
		35	2475	140	19	50	202	56	16	34	3027
	2	1	82	5	1	2	7	2	1	1	100
		1	75	8	1	4	9	5	2	10	18
		3	79	1424	72	33	231	52	10	15	1919
	3	0	4	74	4	2	12	3	1	1	100
		0	2	80	5	3	10	4	1	5	11
		61	54	74	1008	342	154	58	9	7	1767
	4	3	3	4	57	19	9	3	1	0	100
		1	2	4	72	27	7	5	1	2	10
		7	13	1	18	496	8	22	9	0	573
	5	1	2	0	3	86	1	4	2	0	100
		0	0	0	1	39	0	2	1	0	3
		6	12	22	6	8	1058	59	11	1	1182
	6	1	1	2	0	1	90	5	1	0	100
		0	0	1	0	1	47	5	2	0	7
		1	7	0	0	16	2	510	4	3	542
	7	0	1	0	0	3	0	94	1	1	100
		0	0	0	0	1	0	44	1	1	3
		10	0	1	3	1	7	3	495	26	547
	8	2	0	0	0	0	1	1	91	5	100
		0	0	0	0	0	0	0	72	8	3
		0	0	0	0	0	2	5	21	171	198
	9	0	0	0	0	0	1	2	11	86	100
		0	0	0	0	0	0	90	3	51	1
		55	256	64	9	39	133	85	68	10	720
	10	8	36	9	1	5	18	12	9	1	100
		1	8	4	1	3	6	7	10	3	4
Totals		4725	3313	1772	1396	1265	2265	1168	686	335	16925
% of Total		28	20	10	8	7	13	7	4	2	100.0

CHAPTER VI

SUMMARY AND SUBSEQUENT REPORTS

The 1980 Michigan Recreational boating survey has provided up-to-date statistics on boating activity in Michigan and a data base to support a variety of further research and planning analyses. This initial survey report has documented the methods and has presented a broad overview of boaters and boating activity at state and regional levels. Subsequent reports will focus in more detail on market segmentation, planning and forecasting models, and boating economics. Relevant policy and planning recommendations will be advanced in these documents.

SUMMARY

Based upon almost 4000 survey respondents, it is estimated that Michigan's registered boaters logged 16.9 million boat days in 1980. This is an increase of 23 percent over 1977 levels. Boat registrations grew by about ten percent over this same period. About one third of all boat days took place on the Great Lakes and connecting waters. Two thirds of boating activity occurs on inland lakes and streams. Boaters averaged 33 days of boating in 1980, with larger boats and boats stored at waterfront sites the most active. Fishing is the most popular boating activity, accounting for over half of all boat days and almost 60 percent of Great Lakes boating.

The average registered boat owner is 50 years of age, a high school graduate, and has an income (median) of $23,000. Sail boaters tend to have higher incomes, are more educated and somewhat younger than power boaters. Boating is very much a family activity. Older and younger families are the two largest life cycle segments among boat owners. Almost one in every three registered boat owners is an empty nester. Demographic trends promise a strong boating market in the 1980's and 1990's with increasing numbers of young families in the 1980's and more older families and empty nesters in the 1990's.

Although southeastern Michigan generates about half of all Great Lakes boat days and almost 40 percent of all boating, the largest increases in boating activity are occurring in northern Michigan. Second home developments, retirement, and northern migration are all contributing to increased pressures on boating facilities in northern Michigan. The Saginaw Bay region, while receiving low ratings in the quality and quantity of boating opportunities, has also witnessed considerable growth in boating activity over the past decade.

Most boaters boat quite close to home. This includes 40 percent of the registered craft that are stored at non-waterfront permanent homes and trailered to access sites and 24 percent that are stored at waterfront permanent homes. Most of the travel associated with recreational boating can be attributed to boaters using Great Lakes marinas or waterfront second homes. Four percent of registered boats are stored at commercial marinas. These are primarily cabin cruisers and large sail boats. Nineteen percent of registered boats are stored at inland lake second homes and four percent at Great Lakes waterfront summer

homes. Northwest, Northeast and Southwest Michigan are the most popular summer home locations. As the supply of waterfront home sites becomes scarce, demand should increase for marinas, dry stack storage, and dockaminiums.

FURTHER ANALYSIS AND SUBSEQUENT REPORTS

A number of further analyses and reports, based upon the 1980 boater survey, are planned for 1982. The marketing orientation of the survey makes it useful to government agencies and boating industries, both of whom must respond to an increasingly diverse and dynamic boating market. A marketing report is being developed to further explore boater market segmentations and to develop marketing recommendations. In addition, we will be testing some general forecasting and demand estimation models that can be applied to readily available data in order to predict future demand within designated market segments. Finally, we plan to develop estimates of the economic activity associated with boating for specific regions and market segments.

The marketing report will evaluate a number of distinct boater market segments. Some segments that can be identified in the 1980 survey data include: (1) the marina boater, (2) public access site users, (3) Great Lakes boaters, (4) inland lake boaters, (5) sail boaters, (6) boaters with second homes, (7) fishermen, and (8) older boaters. By identifying the size, attributes, needs, and problems of each of these segments, both government and industry can better serve and respond to the market. Since these segments are quite different and growing at different rates, forecasts of boating demand and re-

lated economic activity can be improved if estimates are developed within individual segments.

The 1980 survey data also provides an empirical base for testing general boating demand estimation and forecasting models. We will evaluate alternative planning models and make recommendations for statewide planning, to include recommendations on the design and role of statewide boater surveys. This research will evaluate tradeoffs in costs and accuracy associated with different sample sizes and sampling designs. We believe that sufficiently accurate boating statistics for statewide and regional planning can be estimated with less frequent and less expensive surveys if models incorporating available boat registration and demographic data are employed. The 1980 and previous boater surveys provide a good data base to test such models.

Based upon what data is available we estimate total direct expenditures associated with recreational boating in Michigan to be about $500 million annually. Including indirect effects, boating's contribution to Michigan's economy is over one billion dollars. By combining the 1980 survey data with a 1981 boater expenditure survey we will develop improved estimates of the economic impact of boating on state, regional, and local economies. Economic activity associated with boating will be incorporated into long range forecasting models and will be estimated for designated boater market segments. These results will be useful in selecting target markets and making decisions on statewide and regional planning and development in regard to marinas, access sites, boating facilities, and tourism in general.

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APPENDIX A

THE 1980 SURVEY INSTRUMENT

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF PARK AND RECREATION RESOURCES
NATURAL RESOURCES BUILDING

EAST LANSING · MICHIGAN · 48824

INITIAL COVER LETTER

Dear Boat Owner:

The Department of Park and Recreation Resources at Michigan State University is conducting a study to measure and forecast boating activity in Michigan. You have been selected at random from Michigan's registered boaters to represent Michigan boaters. We request your cooperation in completing the enclosed questionnaire and returning it to us in the convenient stamped return envelope.

Completing the survey will take about five minutes of your time. The information that you provide will be important in planning future boating facilities and programs to better serve the needs of Michigan boaters. This study is funded by the Michigan Sea Grant program. Results will be provided in summary form to both public and private suppliers of boating facilities, products and services. Your response to the questionnaire is important as you will represent the views of thousands of other boaters. Even if you did not boat in 1980 or no longer own a boat, please return your completed questionnaire.

Your participation in this survey is voluntary. Be assured that the information that you provide will not in any way be associated with your name. The University has strict policies on guaranteeing the confidentiality of your responses. Although it is important to us to receive as many completed questionnaires as possible, simply skip any questions that you do not wish to answer. If you do not wish to participate in the study, please indicate this on the questionnaire and return it to us. We will then delete your name from any reminders or follow-up mailings.

Thank you very much for your cooperation. With your help, we hope that our study will contribute to better serving Michigan boaters.

Sincerely,

Daniel J. Stynes
Assistant Professor and Project Leader

1980 MICHIGAN RECREATIONAL BOATING SURVEY

Please answer for the boat identified by the registration number shown on the address label of your envelope. If this boat was **NOT** used for recreational purposes in 1980 please check the box at the right and proceed directly to the final question (question # 28).

Boat not used in 1980 (go to question 28) ☐

DESCRIPTIVE INFORMATON ABOUT YOUR BOAT (Answer for the boat with registration number shown on your address label)

1. Type of boat *(check one)*
   - ☐ 1. Open
   - ☐ 2. Cabin
   - ☐ 3. Sail
   - ☐ 4. Row
   - ☐ 5. Canoe
   - ☐ 6. Pontoon
   - ☐ 7. Other

2. Propulsion *(check one)*
   - ☐ 1. Inboard
   - ☐ 2. Outboard
   - ☐ 3. Sail
   - ☐ 4. Sail with power
   - ☐ 5. Other non-powered
   - ☐ 6. Other powered

3. Horsepower _____

4. Length of boat (ft) _____

5. How many years have you owned **this** boat? _____

6. Where did you usually keep this boat during the 1980 boating season? *(check one answer)*
   - ☐ At permanent residence
   - ☐ At summer cottage or second home
   - ☐ At commercial marina
   - ☐ At yacht club or boat club
   - ☐ At public marina
   - ☐ Other location *(please specify)* _____

   Was this location *(check one)*
   - ☐ A waterfront site with access to the Great Lakes
   - ☐ An inland lake or stream waterfront site
   - ☐ A non-waterfront site

7. Did you own another boat prior to acquiring your present boat?
   - ☐ No
   - ☐ Yes

   

   If yes, please indicate the type, length, and horsepower of your previous boat.

   Type (see question 1 above) _____
   Length (in feet) _____
   Horsepower _____

8. How many years have you been a boat owner? _____ years

GREAT LAKES BOATING USE

9. **WAS THIS BOAT USED ON ANY OF THE MICHIGAN SECTIONS OF THE GREAT LAKES, OR, CONNECTING WATERS*, DURING THE 1980 BOATING SEASON?**
*("Great Lakes" means Lakes Huron, Superior, Erie, Michigan, and St. Clair; "Connecting Waters" means the St. Mary's River, the St. Clair River, and the Detroit River)

☐ NO If "no," please proceed to Question 12.
☐ YES If "yes," please proceed with the next question.

10. **IN THE TABLE BELOW, NAME THE MICHIGAN GREAT LAKES OR CONNECTING WATERS COUNTIES WHERE THIS BOAT WAS USED DURING THE 1980 BOATING SEASON.**
Estimate the number of days that the boat was actually in the water under power or sail in each of these counties.

	Name of County (Write in)	Number of days* this boat was used on Michigan Great Lakes or Connecting Waters
County 1		
County 2		
County 3		

***Note:** Count each day spent boating as a full day. If you boated in more than 3 counties, please list the 3 counties you used most often.

11. Please estimate the percent of your **GREAT LAKES** boating use that involved each of the following boating activities. (Percents should add to 100%)

Great Lakes Boating

Pleasure boating	_____ %
Fishing from boat	_____ %
Waterskiing	_____ %
Other activities	_____
Total Great Lakes Boating Use	100%

INLAND LAKE BOATING USE

12. **WAS THIS BOAT USED ON ANY INLAND LAKES, RIVERS, OR STREAMS IN MICHIGAN DURING THE 1980 BOATING SEASON?**

☐ NO If "no," please proceed with question 15.
☐ YES If "yes," please proceed with the next question.

13. **IN THE TABLE BELOW, NAME THE MICHIGAN COUNTIES WHERE THIS BOAT WAS USED ON INLAND LAKES AND STREAMS DURING THE 1980 BOATING SEASON.** Estimate the number of days that this boat was actually in the water under power or sail in each of these counties.

	Name of County (Write in)	Number of days* **this** boat was used on Michigan Inland Waters
County 1		
County 2		
County 3		

***Note:** Count each part day spent boating as a full day. If you boated in more than 3 counties, please list the 3 counties you used most often.

14. Please estimate the proportion of your **INLAND** boating use that involved each of the following boating activities. (Percents should add to 100%)

Inland Boating	Pleasure boating	_____ %
	Fishing from boat	_____ %
	Waterskiing	_____ %
	Other activities	_____ %
	Total Inland Boating Use	100%

15. Was this boat **transported** from your home or other location to one or more launching sites during the 1980 boating season?

☐ No ☐ Yes

If yes, please estimate how many times this boat **was launched.**

a. At a site with access to the Great Lakes _____

b. At an inland boating site _____

16. How many different places are you aware of, within an hour's drive of your home (permanent residence), for the types of boating you enjoy? _____

How many of **these areas** did you use for boating in 1980? _____

17. How would you rate the quality of boating opportunities within an hours drive of your home? *(check one answer)*

☐ excellent ☐ very good ☐ good ☐ fair ☐ poor ☐ very poor

18. a. Compared with the 1979 boating season, in 1980 did you:

☐ Boat more often ☐ Boat less often ☐ No change in frequency of boating

b. Compared with the 1979 boating season, in 1980 did you:

☐ Boat closer to home ☐ Boat further from home ☐ No change in boating locations

19. Listed below are several reasons why people go boating. Please indicate how important each of these reasons is for you.

Reasons for Boating	**very important**	**moderately important**	**somewhat important**	**of little importance**	**not important**
a. to relax	☐	☐	☐	☐	☐
b. to enjoy nature	☐	☐	☐	☐	☐
c. to be with friends and family	☐	☐	☐	☐	☐
d. for competition & challenge	☐	☐	☐	☐	☐
e. to develop skills	☐	☐	☐	☐	☐
f. for the excitement	☐	☐	☐	☐	☐
g. for fishing	☐	☐	☐	☐	☐

20. **WAS THIS BOAT STOPPED, INSPECTED OR CHECKED BY SHERIFF DEPARTMENT OFFICIALS ON LAND OR IN THE WATER DURING 1980?**

☐ No If "no," please proceed directly to Question 21.

☐ Yes If "yes," complete the table below. Show the number of checks or inspections and the number of tickets or warnings given to operators of **this** boat during 1980.

Name of County (Write in)	**No. of Checks**	**No. of Tickets or Warnings**

DESCRIPTIVE INFORMATION ABOUT YOU AND YOUR FAMILY. The following information is requested to permit us to expand the information about your boating patterns and attitudes to the entire Michigan boating population. Your answers will not in any way be identified with your name or used for purposes other than to estimate statewide boating activity.

21. Please give the county, state, and zip code of your permanent residence.
County _____ State _____ Zip Code _____

22. Age of boat owner _____

23. Education *(circle the appropriate number of years of schooling)*

High school	6	7	8	9	10	11	12
College	1	2	3	4	5	6	7+

24. Race: ☐ White ☐ Black ☐ Hispanic ☐ Other

25. Family income *(check the appropriate income category)*

☐ Less than $10,000
☐ $10,000 - 14,999
☐ $15,000 - 19,999
☐ $20,000 - 24,999
☐ $25,000 - 29,999
☐ $30,000 - 34,999
☐ $35,000 - 39,999
☐ $40,000 or more

26. Do you own a second home, condominium or summer cottage in Michigan?

☐ No ☐ Yes

If yes, in which county is it located? _____ county

27. How many people (including yourself) reside in your household? _____
How many children under 12 years of age? _____

28. **YOUR OPINIONS:** Plese use the remaining space to indicate what you feel are important boating needs or problems that providers of boating facilities and services should address. We will communicate your opinions to the appropriate individuals.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you very much for your assistance. Please return your questionnaire in the convenient stamped, self-addressed envelope. If you should misplace this envelope, return the questionnaire to: **Department of Park and Recreation Resources, 131 Natural Resources Building, Michigan State University, East Lansing, Michigan 48824.**

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POSTCARD REMINDER

Department of Park and Recreation Resources
Michigan State University
December 8, 1980

Dear Registered Boat Owner:

About ten days ago you should have received a copy of the 1980 Michigan Recreational Boating Survey. Perhaps you have already completed and returned it. If not, would you please take a few minutes today to fill it out and mail it back. Your response is important even if you did not boat in 1980.

Thank you very much for your help in this study.

Daniel J. Stynes
Project Coordinator

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF PARK AND RECREATION RESOURCES
NATURAL RESOURCES BUILDING

EAST LANSING · MICHIGAN · 48824

COVER LETTER FOR SECOND COMPLETE MAILING

December 24, 1980

Dear Boat Owner:

May we extend Holiday greetings to you and your family.

The Department of Park and Recreation Resources at Michigan State University is conducting a study to measure and forecast boating activity in Michigan. You should have received a questionnaire from us in early December. Our records indicate that we have not yet received your completed questionnaire. In case you did not receive our original mailing or have misplaced the questionnaire, we are enclosing another questionnaire and return envelope. If you have already sent in your questionnaire, please disregard this letter.

Once again, we should stress that your participation in this study is strictly voluntary. This will be the final mailing that you will receive from us. Most of the boaters we have contacted have returned their questionnaires. In order to provide results that accurately reflect Michigan boaters' concerns and boating patterns, it is important that we obtain your views as well. Won't you please take five minutes to complete the questionnaire and drop it in the mail. Results of the study will be transmitted in summary form to both public and private providers of boating facilities and services. We believe that this study will contribute to better serving your future boating needs. We therefore encourage you to participate in this survey.

Thank you very much for your cooperation. We wish you pleasant boating in the New Year.

Department of Park and Recreation Resources
Michigan State University

APPENDIX B

MICHIGAN GREAT LAKES BOATING REGIONS

An examination of regionalizations presently in use within Michigan resulted in a decision to develop regions specifically tailored to Great Lakes boating rather than to employ existing multiple use regionalizations. Three criteria were used to develop the Great Lakes boating regions:

1. The regions should reflect Great Lakes boating market areas.
2. Regions should be assembled as collections of counties and should be geographically connected.
3. Regions should to some extent reflect recognized sub-areas of the Great Lakes shoreline in Michigan.

Data from the 1977 Recreational Boating survey were analyzed in order to develop market-oriented Great Lakes boating regions. The regionalization employed in the 1977 Boater survey is depicted in Figure B-1. Table B-1 breaks down the GL boat days generated by origin and destination region. Notice that inland regions are not associated with their coastal markets in this regionalization. Even regions with coastal counties send as much as 68% of their GL boat days out of the region.

In developing a market-oriented regionalization we utilized county to county origin-destination data from the 1977 survey to group counties into regions. The regionalization was begun by examining the origin-destination patterns of Great Lakes coastal counties. Adjacent counties were examined for flow interactions. Counties with large intercounty flows were grouped. Counties adjacent to these groups were then examined for participation interactions with the preliminary groups. Those with strong flows to or from the groups were included in the group. This process was iterated until nine regions became distinct. It was felt that further aggregation would

obscure regional differences, and these groups were finalized. A tenth region, representing out-of-state participations, was also added to the regionalization. Once coastal regions had been established, inland counties were assigned to regions. Each inland county was assigned to the contiguous region that received the majority of GL boat-days of participation generated within the county. This assignment process was designed to identify flows of participation from inland counties to the coastal region of greatest participation, allowing for interregional flow comparisons.

Table B-1 summarizes 1977 boating activity in Michigan for the Great Lakes boating regions. An average of 82% of all GL boat days generated in Michigan remains within the region of origin. More importantly, over 60% of the market area of each Great Lakes destination region is included within the region, with most regions containing more than 75% of their market. This is a significant improvement over the present DNR regionalization.

Table B-3 illustrates the performance of the regionalization on coastal and inland portions of each region. A quite consistent 90% of boat days generated within coastal portions of the region remain within the region. An average of 59% of boat days from inland portions of the regions remain in region of origin. The Michigan Great Lakes boating regions graphically illustrate the east-west split in the lower peninsula and depict a northward and westward consumer orientation for Great Lakes boating in Michigan (Figure B-2).

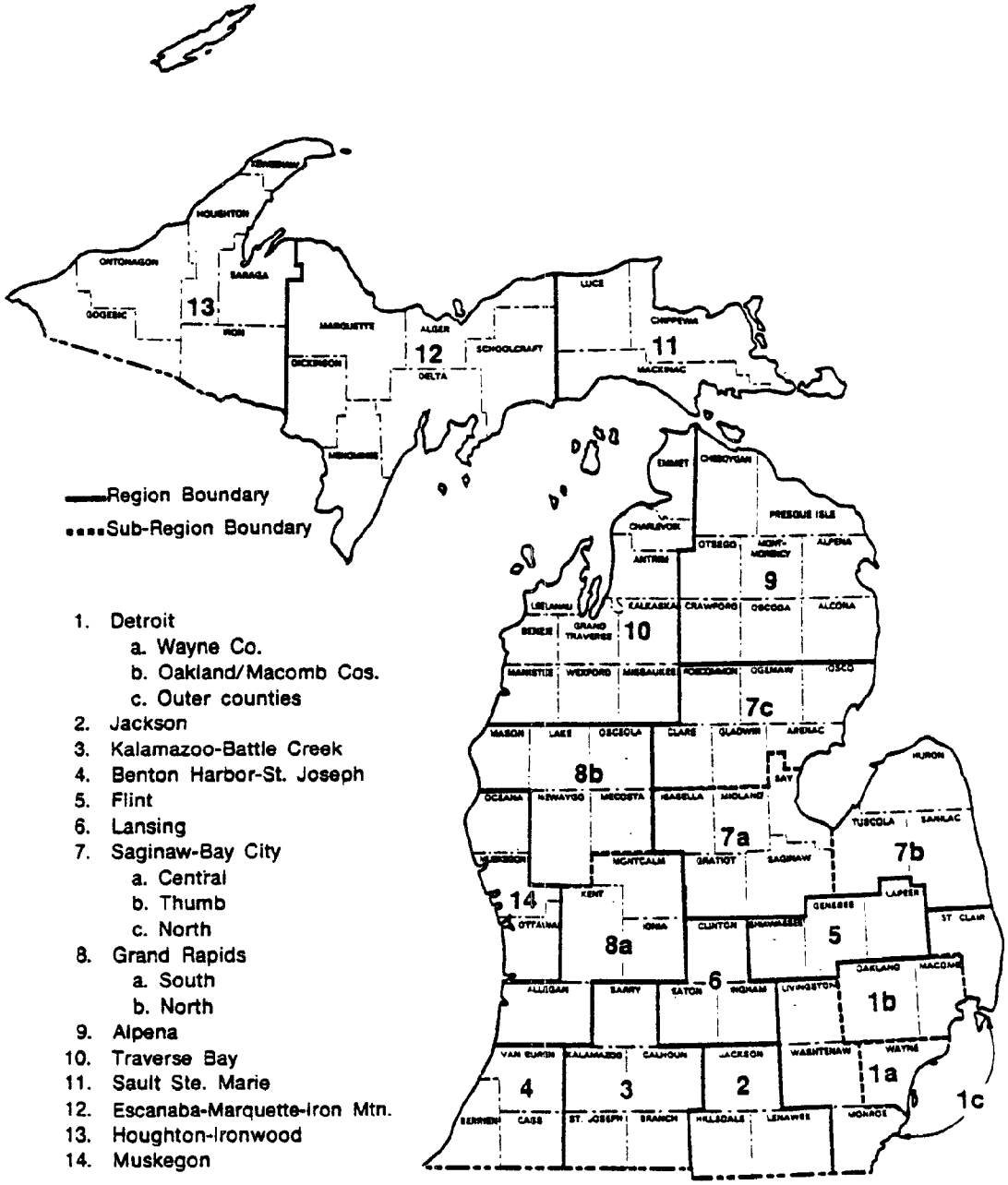

FIGURE B-1. MICHIGAN PLANNING REGIONS

Table B-1. Great Lakes boat-days generated by MDNR regions

Region	Boat-Days Generated (1000's)	Boat-Days Remaining In Region (1000's)	Percent Remaining In Region
1	2190	1881	85.89
2	21	0	0.0
3	73	0	0.0
4	151	128	84.77
5	108	0	0.0
6	71	0	0.0
7A	225	105	46.67
7B	79	71	89.87
7C	48	39	32.88
8A	156	36	53.21
8B	28	14	50.00
9	103	72	69.90
10	186	179	96.24
11	146	139	95.21
12	103	94	91.26
13	75	72	96.00
14	285	242	84.91
Out-of-State	145	0	0.0
Totals	4193	3072	73.26

Source: Analysis of 1977 Michigan Recreational Boating Study, Raw Data Tapes

Table B-2. Great Lakes Boat-days generated by Great Lakes Boating

Region	Boat-Days Generated (1000's)	Boat-Days Remaining In Region (1000's)	Percent Remaining In Region
1	2198	1883	85.67
2	343	211	61.52
3	413	326	78.45
4	429	295	68.76
5	85	67	78.82
6	189	180	95.24
7	210	196	93.33
8	134	122	91.04
9	48	43	89.58
Out-of-State	145	0	0.0
Totals	4194	3323	79.23

SOURCE: Analysis of 1977 Michigan Recreational Boating Survey, Raw Data Tapes

Table B-3. Great Lakes Boat-days generated within coastal and inland portions of Great Lakes Boating Regions

Region	Coastal Portion of Region				Inland Portion of Region			
	Participation Generated (1000's)	Percent of Total	Remaining In Region (1000's)	Percent Remaining	Participation Generated (1000's)	Percent of Total	Remaining In Region (1000's)	Percent Remaining
1	1837	43.8	1642	89	361	8.6	241	67
2	179	4.3	159	89	164	3.9	51	31
3	285	6.8	242	85	127	3.0	84	66
4	182	4.4	159	88	247	5.9	136	55
5	75	1.8	65	86	10	.3	3	26
6	178	4.2	173	97	11	.3	7	60
7	208	4.9	194	93	2	.1	2	81
8	131	3.1	119	91	3	.1	3	89
9	48	1.1	43	89	No Inland Counties			
10	No Great Lakes Counties				145	3.5	Unknown	
Totals	3123	74.4	2796		1070	25.2	527	
Mean				90.				59